COMSPHERE® 3000 SERIES CARRIER

INSTALLATION MANUAL

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PARADYNE®

COMSPHERE
3000 Series Carrier
Installation Manual

Changes and enhancements to the product and to the information herein will be documented and issued as a new release.

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⚠ Important Safety Instructions

1. Read and follow all warning notices and instructions marked on the product or included in the manual.
2. This product is intended to be used with a 3-wire grounding type plug – a plug which has a grounding pin. This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adapter.

   Prior to installation, use an outlet tester or a voltmeter to check the ac receptacle for the presence of earth ground. If the receptacle is not properly grounded, the installation must not continue until a qualified electrician has corrected the problem.

   If a 3-wire grounding type power source is not available, consult a qualified electrician to determine another method of grounding the equipment.

   The dc configuration of this product is to be grounded by connecting an external wire between the building ground and the equipment ground screw on the rear of the power supply assembly. Consult a qualified electrician to ensure that the ground connections are connected.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
4. Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.
5. Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.
6. General purpose cables are provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.
7. Install carriers while still empty. Start at the bottom of the cabinet and work up.
8. When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.
9. A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are **interconnected**, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.
10. In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:
    - Never install telephone wiring during a lightning storm.
    - Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
    - Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
    - Use caution when installing or modifying telephone lines.
    - Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
    - Do not use the telephone to report a gas leak in the vicinity of the leak.

11. To reduce the risk of fire, this component card cage must be installed in a suitable Electrical and Fire Enclosure that complies with enclosure, mounting, causality and segregation requirements of the end-use product. Openings located within the enclosure must be separated from any network-connected component by a minimum of 25 millimeters of air when measured in any dimension, unless the openings are five millimeters or less, or measure one millimeter in length, regardless of the width.
12. To reduce the risk of fire, use a UL Listed or CSA Certified minimum No. 26 AWG telecommunications cable.

Notices Regarding Telecommunications Equipment

WARNING

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

THE AUTHORITY TO OPERATE THIS EQUIPMENT IS CONDITIONED BY THE REQUIREMENTS THAT NO MODIFICATIONS WILL BE MADE TO THE EQUIPMENT UNLESS THE CHANGES OR MODIFICATIONS ARE EXPRESSLY APPROVED BY PARADYNE.

WARNING

TO USERS OF DIGITAL APPARATUS IN CANADA:

THIS CLASS A DIGITAL APPARATUS MEETS ALL REQUIREMENTS OF THE CANADIAN INTERFERENCE-CAUSING EQUIPMENT REGULATIONS.

CET APPAREIL NUMÉRIQUE DE LA CLASSE A RESPECTE TOUTES LES EXIGENCES DU RÈGLEMENT SUR LE MATÉRIEL BROUILLEUR DU CANADA.

Canada

Notice to Users of the Canadian Public Switched Telephone Network

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone line and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

CAUTION

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

The Load Number for this equipment is listed on a label on the device. The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all devices does not exceed 100.

United Kingdom

Ringer Equivalence Number

The Ringer Equivalence Number (REN) is a customer guide indicating approximately the maximum number of items of apparatus that should be connected simultaneously to the telephone line. The sum of the RENs should not exceed four. This value includes any BT-provided instrument which may be assumed to have a REN of 1 unless marked otherwise. The REN of this apparatus is 1.

Connection to Leased Lines

If any other apparatus, including cable or wiring, is connected between the apparatus and the point of connection to any speechband circuit, then all that other apparatus shall comply with the following:

1. The overall transmission characteristics of all that other apparatus shall be such as to introduce no material effect upon the electrical conditions presented to one another by the apparatus and the speechband circuit; and

2. All that other apparatus shall comprise only:

   (i) apparatus approved for the purpose of connection between the apparatus and a speechband circuit; and

   (ii) cable or wiring complying with a code of practice for the installation of equipment covered by this part of BS 6328 or such other requirements as may be applicable.

No d.c. interaction is intended between the apparatus and the telephone network.

All European Countries

Safety Notice

Interconnection circuits between a modem and any other equipment should be such that the equipment continues to comply with the requirements of EN41003 for TNV (Telephone Network Voltage) circuits and EN60950 for SELV (Safety Extra Low Voltage) circuits after making connection between circuits.

Japan

Notices

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This equipment is classified in the 1st Class category. When used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc. VCCI-1*

Restrictions

Due to JATE (Japan Approvals Institute for Telecommunications Equipment) regulations, only 3 attempts to dial a number are permitted in a 3-minute period. If a fourth attempt is made to dial the same number, the modem returns the ERROR return code. This restriction applies to the number dialed from the command line or from a directory. An occurrence of the restriction is canceled when a different number is dialed, or when 3 minutes have elapsed.

Equipment Warranty and Support

If you experience trouble with this equipment, please contact your sales or service representative (as appropriate) for repair or warranty information. If the product needs to be returned to the company service center for repair, contact them directly for return instructions using one of the following methods:

- **Internet:** Visit the Paradyne World Wide Web site at **www.paradyne.com**.
- **Telephone:** Call our automated call system to receive current information via fax or to speak with a company representative.
  - — Within the U.S.A., call 1-800-870-2221
  - — Outside the U.S.A., call 1-727-530-2340

If the trouble is causing harm to the telephone network, the telephone company may request that you remove the equipment from the network until the problem is resolved.

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Preface

About This Document

This document contains installation information for the COMSPHERE 3000 Series Carrier and is designed to be used with:

- Data Service Units (DSUs): Models 3511, 3551, 3611, and 3616
- Data Backup Modules (DBMs): Model 3611
- Dial/lease modems: Models 3811, 3811*Plus* (3981), 3821*Plus*, 3911, and 3921*Plus*
- T1 Channel Service Units (CSUs): Model 3151
- T1 DSU/CSUs: Model 3161

Refer to the appropriate device manual for specific unit installation and operation information. It is assumed that you are familiar with the functional operation of data equipment, digital network services, DSUs, and dial/lease modems.

Document Contents

Chapter 1 provides descriptive information about the COMSPHERE 3000 Series Carrier and optional features.

Chapter 2 provides descriptive information and procedures for installing the:

- Shared Diagnostic Control Panel (SDCP)
- Power supply
- Fan module
- Speaker panel
- Network Interface Module (NIM)
- Shared Diagnostic Unit (SDU)
- DSU
- Dial/lease modem
- Ferrite chokes.

Chapter 3 includes T1 CSU and T1 DSU/CSU auxiliary backplane installation procedures.

Chapter 4 presents details regarding connecting to the network.

Chapter 5 provides circuit card installation procedures.

Appendix A provides pin assignments.

Appendix B includes T1 CSU and T1 DSU/CSU interface connections.

Appendix C presents technical specifications.

Appendix D includes related documents and an equipment list.

The Glossary provides definitions for acronyms and product-specific terms used in this manual.

Document Ordering Information

For a list of related documents, see Table D-1 in Appendix D, *Equipment List*.

Introduction 1

Overview 1-1
Carrier Components 1-2

Overview

The COMSPHERE® 3000 Series Carrier assembly, Figure 1-1, supports high-density mounting of the following Paradyne products in a central-site environment:

- Channel Service Units (T1 CSUs)
- Data Service Units/Channel Service Units (T1 DSU/CSUs)
- Data Service Units (DSUs)
- Dial Backup Modules (DBMs)
- Time Division Multiplexer (TDM)
- Multichannel Multipoint Multiplexer (MCMP)
- Dial/Lease Modems

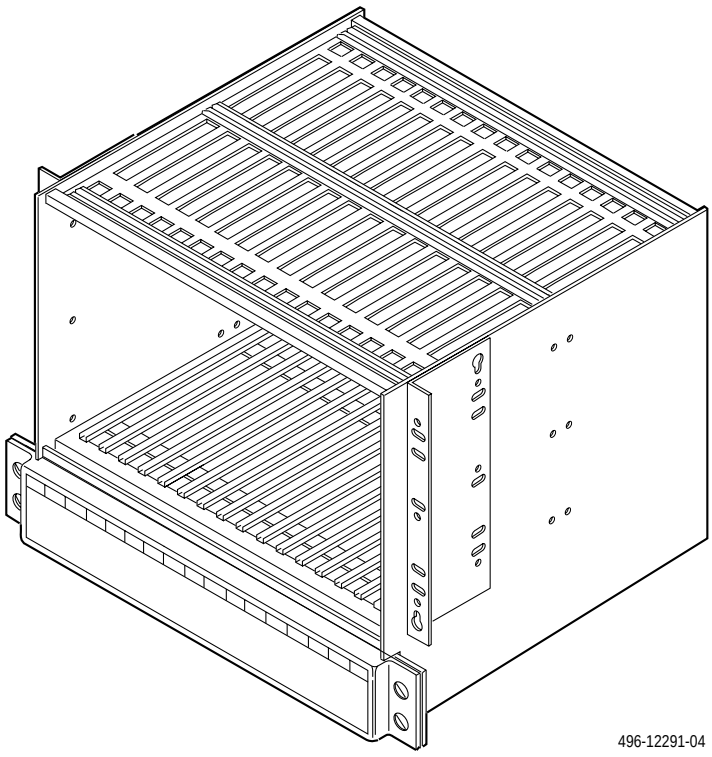

Figure 1-1. COMSPHERE 3000 Series Carrier

Carrier Components

The carrier assembly is shipped with a power transformer unit. Refer to Equipment List (Table D-2) in Appendix D for details. Other carrier components are ordered separately:

- **Power transformer unit**. Provides low voltage ac power to the carrier's internal power distribution bus.
- **–48 Vdc Central Office (CO) Power Unit**. For carriers designed to operate from a –48 Vdc power unit. Consists of a single dc power module with a fan and operates in Basic mode. An optional second power module is available for the CO Power Unit.
- **Fan module**. Provides forced air cooling to dissipate heat generated within the carrier. It is recommended that fully configured carriers and cabinets have fan modules installed to extend the life of the equipment.
- **Shared Diagnostic Control Panel (SDCP)**. Required for initial installation and testing of the devices and their options. In conjunction with the SDU, allows up to eight carriers to be managed from one control panel.
- **Speaker panel**. Provides audio monitoring of dial/lease modems. Allows the user to hear audio signals (ringing, busy signal) during normal operation.
- **Network Interface Modules (NIMs)**. Provides the dial, ISDN, or switched 56 kbps digital service interface for DSUs, DBMs, and dial/lease modems.
- **Shared Diagnostic Unit (SDU)**. Provides the required interface that daisy chains carriers together for network management system (NMS) and/or SDCP control. In a cabinet configuration, connectivity between the units in the individual slots allows control of compatible units in the carrier. The control can be a single NMS interface, a single SDCP, or both.
- **T1 auxiliary backplane(s)**. Provides an interface between a T1 digital network and customer provided equipment (CPE).
- **Rear connector plate(s)**. Provides the interface between DSUs, DBMs, and dial/lease modems and the DTEs.
- **Connector module(s)**. Provides the interface between DSU/TDMs or DSU/MCMPs and the DTEs.
- **Filler panel(s)**. Prevents accidental contact with backplane connectors. Required for unfilled slots in the carrier.

Installing the Carrier and Assembly Components 2

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Overview

The COMSPHERE 3000 Series Carrier is a metal enclosure that has seventeen slots for installing circuit cards. The Shared Diagnostic Unit (SDU) uses Slot 0; the other sixteen slots are for devices. This number is reduced by one slot for:

- Dial/lease multiport modems, which occupy two slots.
- DSU with MUX card. The MUX card for TDM or MCMP is physically attached to a DSU, and the two cards occupy two slots.
- Digital bridge applications, where each DBM-*X* also occupies a separate slot.

Standard Carrier Equipment

Each carrier is shipped with the items listed below bundled in a plastic bag:

- Six cable ties
- Two fuses (spares)
- Four #10-32 mounting screws
- Four cabinet #12-24 mounting screws and four self-retaining nuts for use with cabinets without threaded screw holes
- One jumper wire for the frame ground/signal ground

In addition, the carrier is shipped with a power cord and power transformer unit. Figure 2-1 shows a fully loaded carrier.

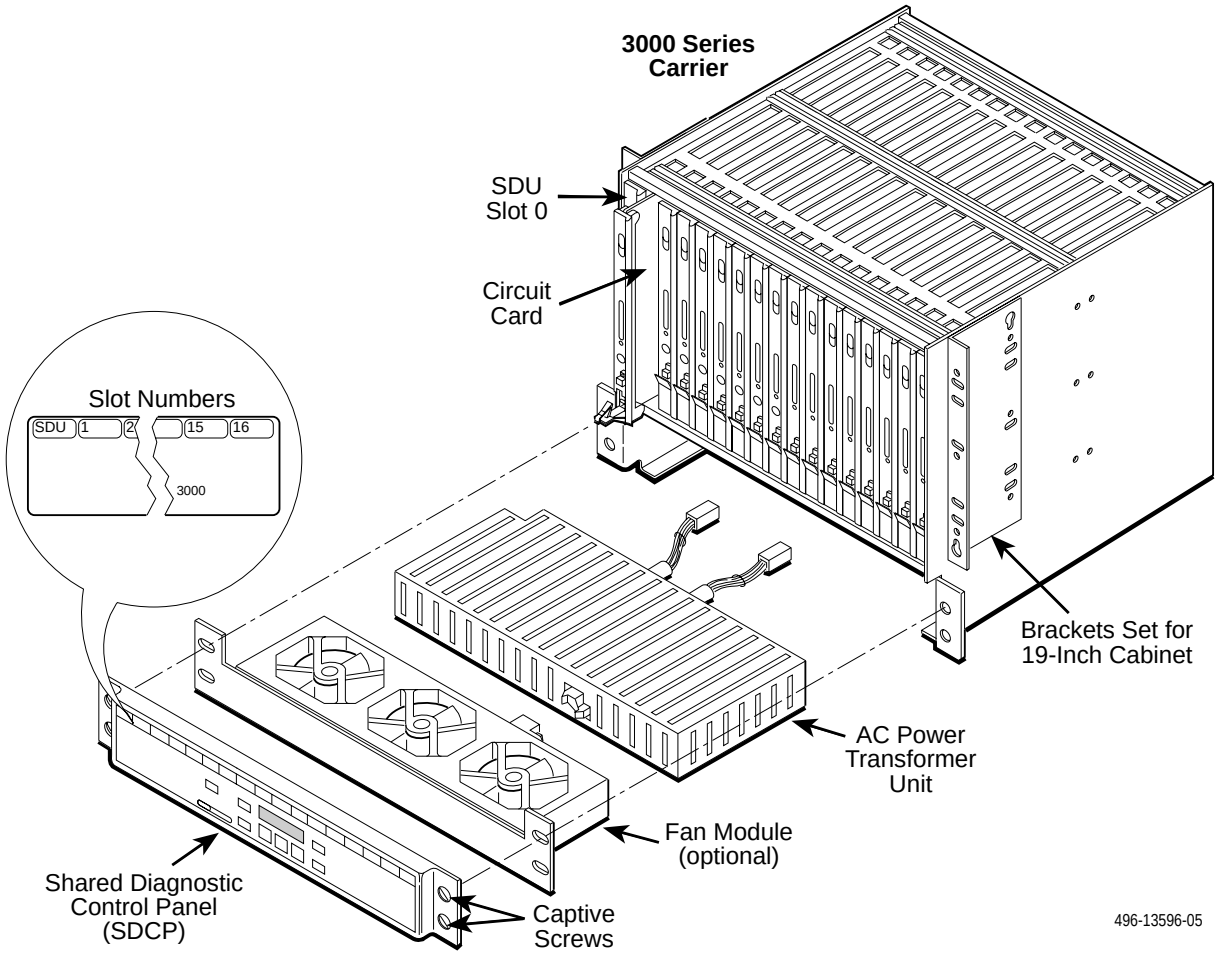


Figure 2-1. 3000 Series Carrier and Components

Other Carrier Equipment

You are responsible for ordering/supplying the following equipment:

- An EIA standard 19- or 23-inch wide cabinet
- Fan module(s), if needed
- Shared Diagnostic Control Panel (SDCP)
- Shared Diagnostic Unit (SDU), if needed
- DTE interface assembly, if needed
- Alarm buzzer or light
- One or two Network Interface Modules (NIMs), if needed
- Connector modules
- Speaker panel, if needed
- One network interface cable for each of the DSUs or modems
- TDM, MCMP, and/or digital bridge interface cables, if needed
- Connecting cables and cords
- Rear connector plates for optional pre-mounting; modular devices are packaged with rear connector plates. You can also order rear connector plates separately
- Filler panels for empty slots
- T1 auxiliary backplane(s), if needed
- Devices, including DSUs and CSUs
- Applicable manuals. Appendix D contains a related documents list and equipment list.

Preinstallation Inspection

When your equipment arrives, perform an inspection:

- **Carrier.** Remove the carrier from its shipping container and check for physical damage.
- **Fan module.** Check for physical damage, such as broken blades. Spin fan blades manually to test for damage.
- **Power transformer unit.** Ensure that the unit has not been damaged, possibly causing a short circuit of internal components. Tighten any screws that may have worked loose.
- **Shared Diagnostic Control Panel (SDCP).** Inspect the SDCP and its cable.
- **Shared Diagnostic Unit (SDU).** Check the SDU for physical damage. Ensure that the circuit card and faceplate are not damaged.
- **Speaker panel.** Check the speaker, speaker jack, and panel for physical damage.

If any of your equipment shows signs of shipping damage, report this immediately to your shipping and service representatives.

Installation Considerations

Before installing your carrier, make sure:

- Your installation site is well-ventilated, clean, and free of environmental extremes.
- You have 2 to 3 feet clearance at the front and rear of the cabinet for installing the following:
  - DTE cables
  - Fan module
  - Network interface connectors
  - Rear connector plates or connector modules
  - SDCP (optional)

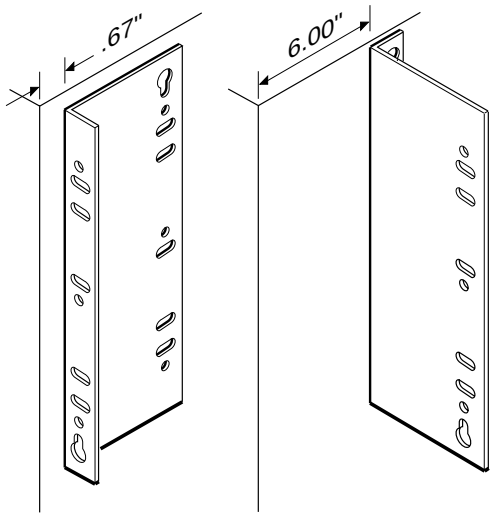
You will need the following tools:

- A large Phillips screwdriver to install a:
  - Carrier in the cabinet
  - Power transformer unit under the carrier
- A small, flat-blade screwdriver for:
  - Removing and replacing the cover plate or SDCP
  - Installing the 50-pin cable connectors

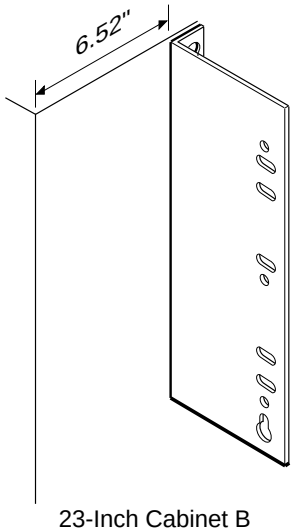
Positioning the Mounting Brackets

The carrier has reversible mounting brackets, which allow installation in cabinets that are either 19 inches or 23 inches wide. The brackets:

- Are initially positioned for installation into a 19-inch cabinet.
- Must be reversed on the carrier for installation into an EIA standard 23-inch wide cabinet.



19-Inch Cabinet 23-Inch Cabinet A



23-Inch Cabinet B

496-12293-04

To reverse the mounting brackets:

▶ Procedure

1. Remove the screws that attach them to the sides of the carrier.
2. Reverse the brackets and replace the screws.

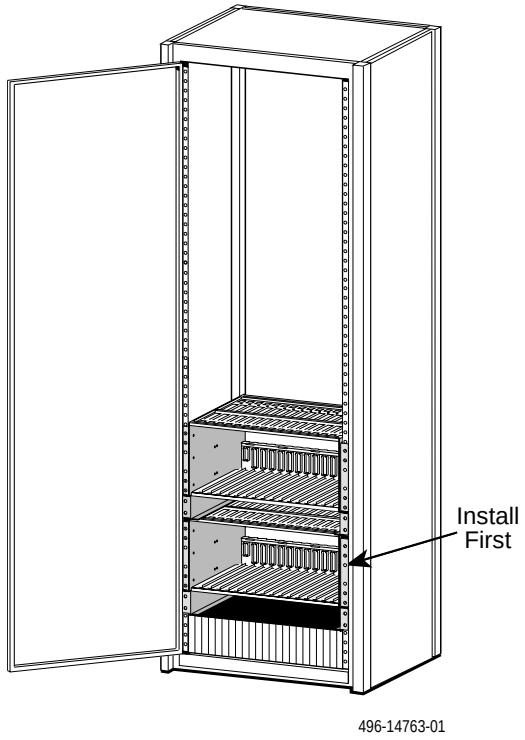
Carrier Installation

HANDLING PRECAUTIONS FOR STATIC-SENSITIVE DEVICES

This product is designed to protect sensitive components from damage due to electrostatic discharge (ESD) during normal operation. When performing installation procedures, however, take proper static control precautions to prevent damage to equipment. If you are not sure of the proper static control precautions, contact your nearest sales or service representative.

One 72-inch cabinet can hold up to six carriers; however, a cabinet does not need to be fully populated. Follow these rules during installation.

- Install carriers from the bottom of the cabinet and work up. This provides the following:
  - — Proper alignment for subsequent carriers.
  - — Easier installation since the carriers can be lowered onto the mounting screws from above.
  - — Convenient connection of the DTE interface.
  - — Proper cabinet balance. Bottom-up installation keeps the cabinet from becoming top heavy.
- Install empty carriers in the cabinet.



496-14763-01

The carrier cabinet may or may not have threaded screw holes.

If the cabinet . . .	Then . . .
Has threaded screw holes	Use the short Phillips-head screws included in the hardware package and follow the procedure in *Installing a Carrier With Threaded Screw Holes* in the next section.
Does not have threaded screw holes	Use the self-retaining nuts and the longer Phillips-head screws included in the hardware package and follow the procedure in *Installing a Carrier Without Threaded Screw Holes* on page 2-6.

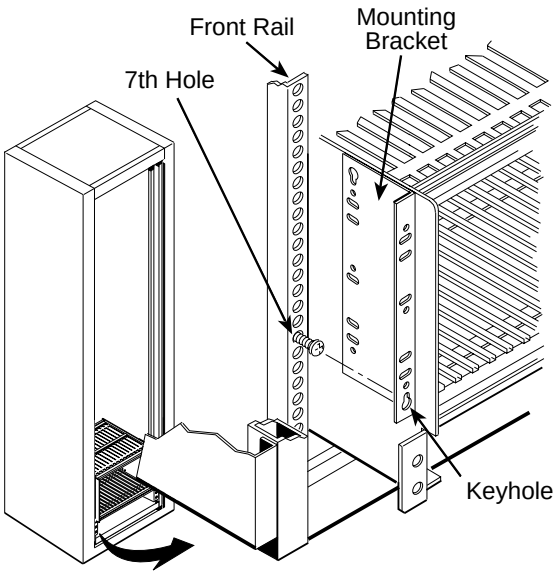
NOTE

Installing the carrier may be a two-person task. One person holds the carrier in proper alignment, and one person installs the screws.

Installing a Carrier With Threaded Screw Holes

▶ Procedure

1. Place the carrier against the front rails at the bottom of the cabinet to determine where the two lower machine screws should be installed. Then, set the carrier aside.



Front of 19-inch Carrier Cabinet

496-12294-02

2. Use a screwdriver to install the two screws loosely enough to allow the bracket keyholes to drop under the screw heads during installation.

3. Place the carrier against the front rails of the cabinet again, allowing the installed machine screws to pass through the keyholes.

4. Lower the carrier into place, allowing the keyholes to slide under the screw heads.

   This positions the carrier correctly for installation of the two remaining machine screws and helps support its weight during installation of these screws.

5. Install the two remaining machine screws at the top corners of the carrier and tighten all four.

6. Install the next carrier in the same manner (from the bottom up) using Steps 1 through 5.

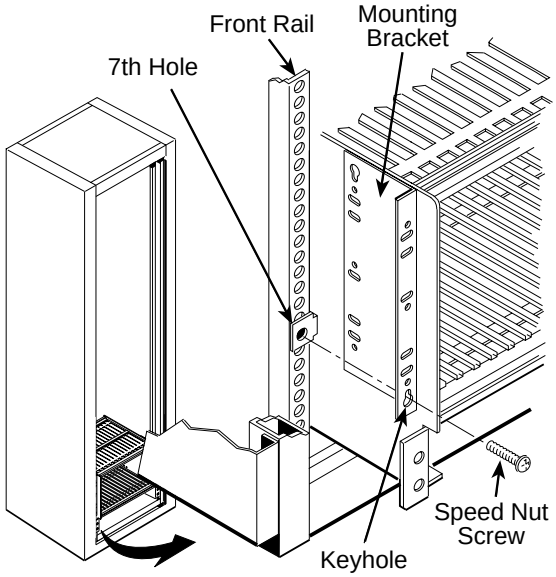
Installing a Carrier Without Threaded Screw Holes

▶ Procedure

1. Position the carrier in the cabinet and determine the front rail holes to be used.

2. Slip a self-retaining nut onto each rail hole selected and align the hole of the nut with the hole in the rail.

3. Line the carrier mounting bracket up with the self-retaining nut, and turn the screw into the carrier mounting bracket and the nut. Start all four screws, then tighten all four until each screw head is flush with the carrier and the carrier is securely mounted in the cabinet.



Front of 19-inch Carrier Cabinet

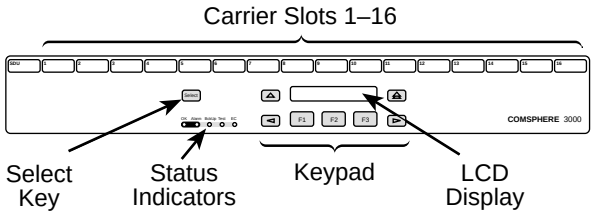
496-12294a-02

4. Install the next carrier in the same manner (from the bottom up) using Steps 1 through 3.

SDCP Installation

An SDCP can control up to eight carriers containing:

- Up to 128 compatible T1 CSUs, T1 DSU/CSUs, DSUs, or dial/lease modems, or
- A reduced number when TDMs, MCMPs, DBMs, or dial/lease multiport modems are also installed.



496-12348a-03

If your configuration has two or more carriers, an SDU is also required in each carrier to connect the SDCP interface from carrier to carrier. Refer to the *SDU Installation* section, page 2-16.

The following table defines the SDCP status indicators.

Label	Color	Description
OK	green	Health and status indicator for the selected device. Mirrors the **OK** indicator on the faceplate, except for dial/lease modems, where **OK** replaces the power indicator.
Alarm	red	Health and status indicator for the selected device. Mirrors the **Alrm** indicator.
BckUp	yellow	Mirrors the **Dial** indicator on the selected device. Not used for T1 CSUs and T1 DSU/CSUs.
Test	yellow	Mirrors the **Test** indicator on the selected device.
EC	green	Error Correction indicator for dial/ lease modems. Not applicable for other devices.

Installing the SDCP Ribbon Cable

NOTE

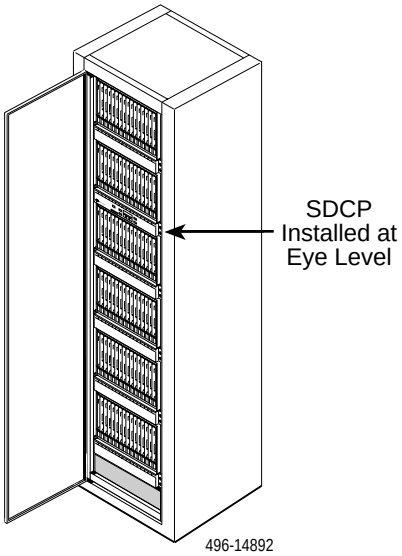
The SDCP ribbon cable must be connected to the carrier backplane before the power transformer unit and optional fan module are installed.

Removing power causes loss of service to all circuit card slots in the carrier. It is recommended that you do not perform this procedure during peak operating hours.

▶ Procedure

1. Select the carrier on which to install the SDCP.

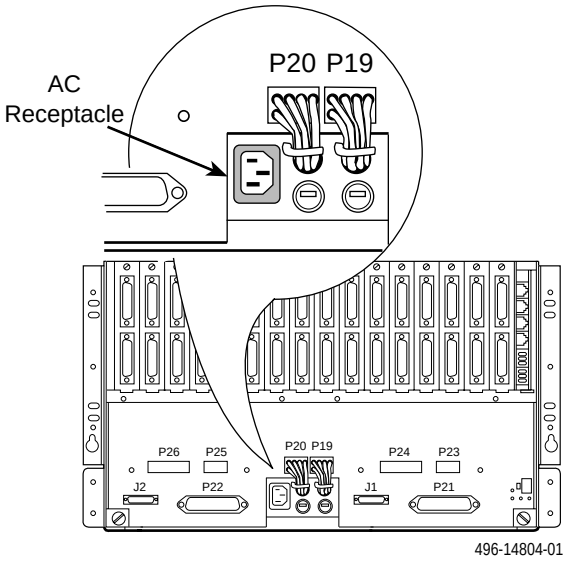
   The SDCP can be installed on any carrier in a cabinet. The most convenient height for the SDCP is at eye level (the second or third carrier from the top of the cabinet).



2. Remove the carrier's cover plate by unscrewing the four captive screws.

If the ac power transformer unit is . . .	Then go to . . .
Installed	Step 3
Not installed	Step 6

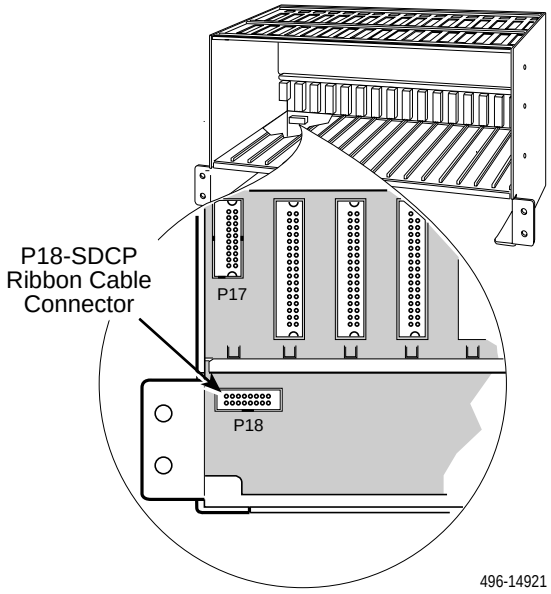
3. At the rear of the carrier, disconnect the ac power cord from the carrier. Unscrew the two captive screws securing the power transformer unit.



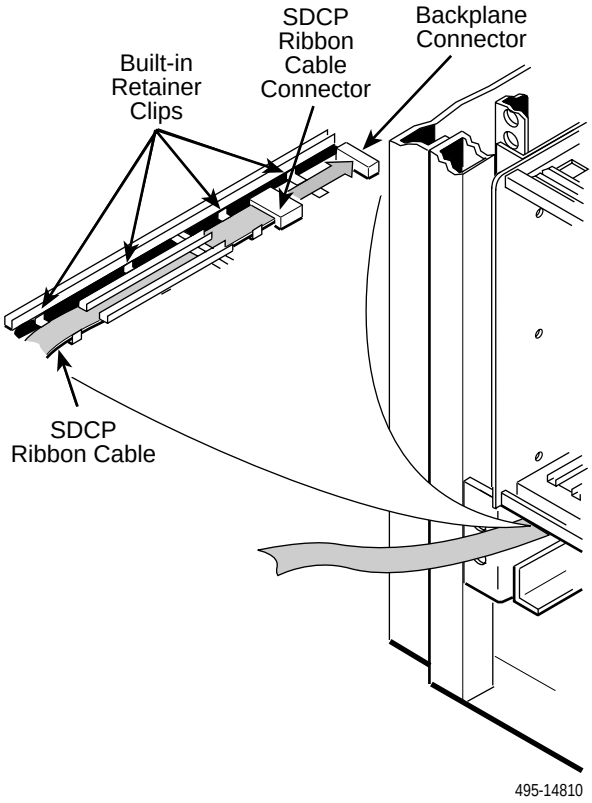
4. Disconnect the two power connectors (P19 and P20) by pressing the catch on the bottom of each and pull it free of its mating connector.

5. At the front of the carrier, slide the power transformer unit straight out and set aside. You may need another person standing at the rear to feed the transformer output wires through the opening in the backplane.

6. Attach either end of the 16-pin ribbon cable (delivered with the SDCP) to the P18 ribbon cable connector.



7. Feed the ribbon cable through the four built-in retainer clips provided in the carrier.



Install the power transformer unit. Refer to the next section, *Power Transformer Unit Installation*.

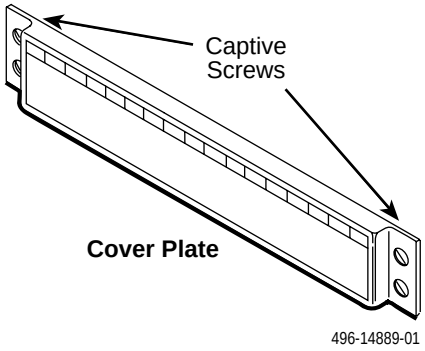
Power Transformer Unit Installation

If you are . . .	Then . . .
Installing an SDCP in the carrier	Go to the *SDCP Installation* section, page 2-6.
Not installing an SDCP	Continue with the following procedure.

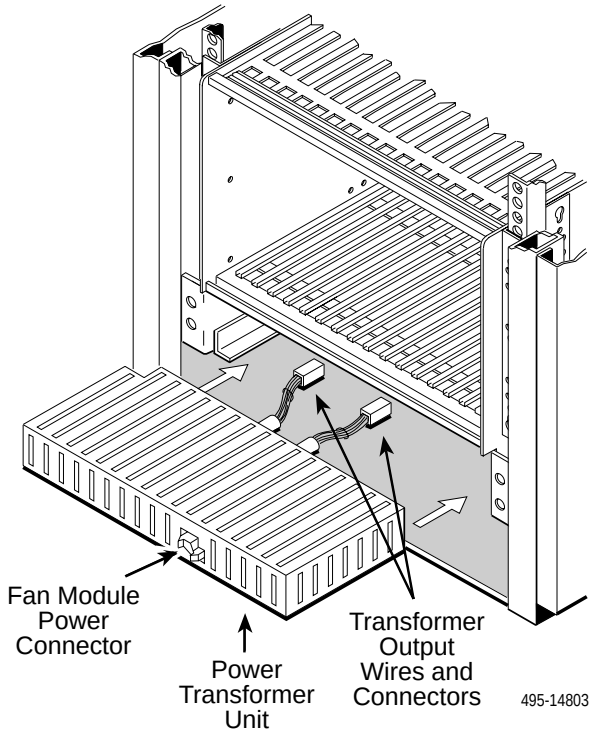
The carrier obtains low voltage ac power from the power transformer unit mounted at the bottom of the carrier.

▶ Procedure

1. At the front of the carrier, remove the cover plate by unscrewing the four captive screws.



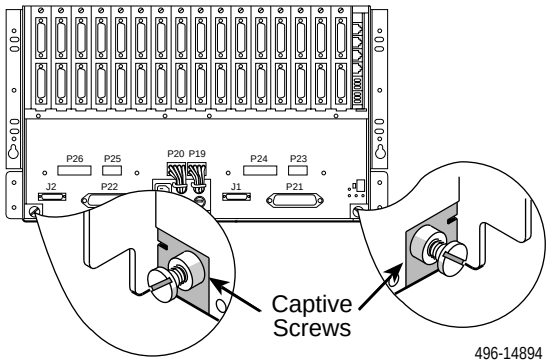
2. Place the power transformer unit on the flanges at the bottom of the carrier. Slide the power transformer unit into place against the rear rail of the enclosure, guiding the transformer output wires through the opening in the backplane.



NOTE

The power transformer unit output wires are terminated with plastic connectors. The power transformer unit must be installed with the output wires protruding through the backplane carrier.

3. At the rear of the carrier, use the larger screwdriver to tighten the two captive screws that fasten the power transformer unit to the carrier.

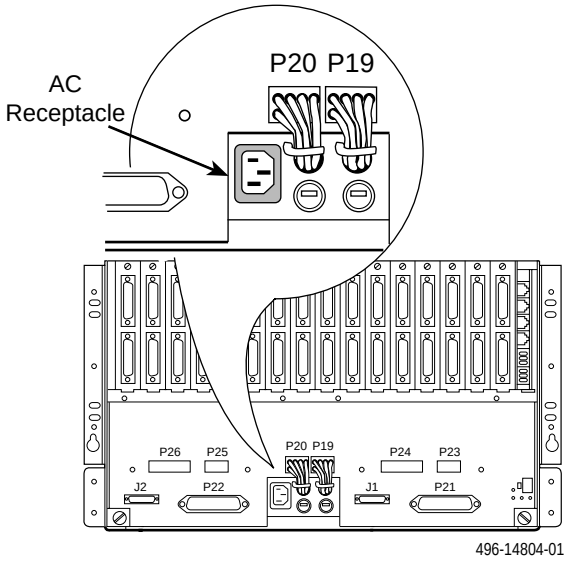


4. Plug the power transformer output connectors into the P19 and P20 connectors on the backplane and latch them.

CAUTION

The power cord contains a 3-wire grounding-type plug which has a grounding pin. This is a safety feature. Grounding of the carrier is vital to ensure safe operation. Do not defeat the purpose of the grounding plug by modifying it or by using an adapter.

Prior to installation, use an outlet tester or voltmeter to check the ac receptacle for earth ground. If the power source does not provide a ground connection, consult an electrician to determine another method of grounding the carrier before proceeding with the installation.



5. Plug the appropriate end of the power cord into the ac receptacle on the carrier.

6. Attach the ferrite choke on the ac power transformer cord as close as possible to the connector.

7. Plug the other end of the power cord into one of the convenience outlets inside the cabinet, or to an external ac outlet.

If you are not installing a fan module or SDCP, return to the front of the carrier and replace the cover plate. Use the smaller screwdriver to tighten the four captive screws.

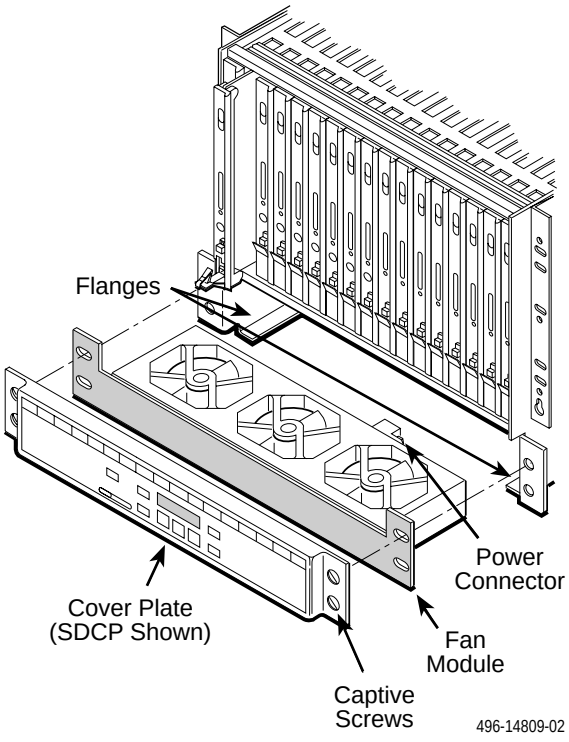
Fan Module Installation

Install a fan module for installations where the ambient temperature is likely to be near the upper limit of the acceptable range (see Table 2-1) to provide forced air cooling.

The power transformer unit must be installed before the fan module.

▶ Procedure

1. If the carrier has been installed, remove the cover plate by loosening the four captive screws. Set the cover plate aside.



2. Place the fan module on the flanges at the bottom of the carrier with the power connector facing the mating power connector on the installed power transformer unit.

3. Slide the fan module into the carrier until the power connectors engage firmly.

4. Once the carrier is connected to ac power, the fans in the fan module will begin blowing. If they do not, check potential reasons in the following table.

If the . . .	Then . . .
Fan module does not operate	Check the fuses on the back of the power transformer unit.
Fuses are blown	Replace and determine the cause of the overload.
Fuses are okay	Install the fan module in another powered carrier.
Fan module still does not work	Replace the fan module.
Fan module works in a different carrier	Replace the power transformer unit of the first carrier.

5. If you are not installing an SDCP or a speaker panel, reposition the cover plate over the installed fan module. Use a small screwdriver to engage and tighten the four captive screws.

To install . . .	Go to the . . .
An SDCP	*SDCP Installation* section on page 2-6.
A speaker panel	*Speaker Panel Installation* section on page 2-12.

Table 2-1
Fan Module Cooling Requirements

Ambient Temperature Range	Circuit Card Configuration[1]	Number of Carriers			
		1–2	3	4	5–6
39° – 86°F (4° – 30°C)	DSUs without DBMs and CSUs	No fan modules			1 fan module (place in second carrier from top)
	Dial/lease modems and DSUs with DBM [2]	No fan modules	1 fan module (place in middle carrier)	2 fan modules (place in bottom carrier and second from top)	1 fan module per carrier
	T1 DSU/CSUs [2]	1 fan module per carrier or 1 fan module per two carriers (placed in upper carrier)			
86°– 122°F (30°– 50°C)	T1 DSU/CSUs [2]	1 fan module per carrier (Limit of 3 carriers in a cabinet at temperatures above 40°C or 104°F) [3]			

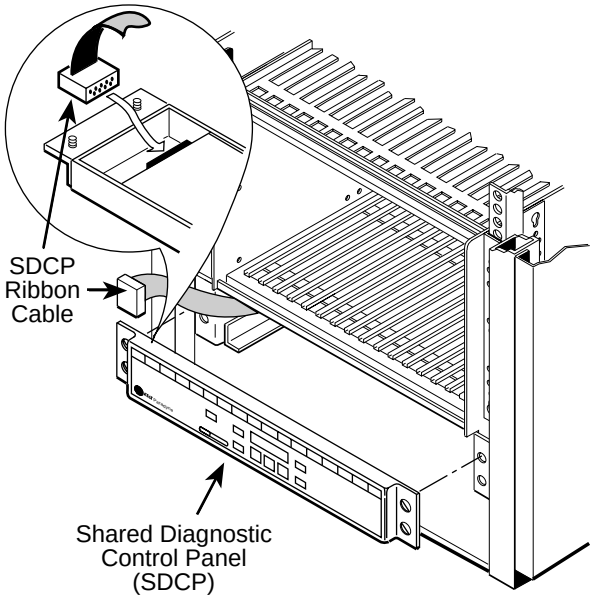
[1] Installing the TDM or MCMP option has no effect on this table.
[2] Use the strictest cooling requirements when there is a mixture of units installed.
[3] Allow 1.75″ (IU) spacing between carriers if more than 3 carriers are required.

Installing the SDCP

After the SDCP ribbon cable, power transformer unit, and optional fan module are installed:

▶ Procedure

1. Attach the connector on the free end of the ribbon cable to the back of the SDCP.



2. Secure the panel to the front of the carrier with its four captive screws, using the same screw holes that held the blank cover plate.

The display on the SDCP should light up immediately. Continue with the following section, *Testing the SDCP*. If the SDCP does not light up:

- Check the ac power connections at the rear of the carrier and the two fuses at the rear of the power transformer unit.
- Verify that both ends of the SDCP ribbon cable are seated securely in their connectors.
- If the SDCP still does not light up, call your service representative.

Testing the SDCP

Once devices have been installed (see Chapters 4 and 5), use the following procedure to test the SDCP by entering device addresses.

▶ Procedure

1. From the front panel, press **Select**.
2. Enter a valid carrier and slot address. Refer to the *SDU Installation* section, page 2-16, for information on carrier addresses.
   - — For T1 CSUs and T1 DSU/CSUs, the green **OK** indicator flashes and should be the only **OK** indicator flashing in the cabinet.
   - — For all devices except T1 CSUs and T1 DSU/CSUs, the yellow **Front Panel** indicator on the selected device should light and should be the only **Front Panel** indicator lit in the cabinet.
3. Press **Select** again. The SDCP display should show the:
   - — Last menu displayed.
   - — Top-level menu on the selected device, in the case of a new installation.

Speaker Panel Installation

You can install an optional speaker panel to provide audio monitoring of any dial/lease modem installed in a cabinet containing COMSPHERE 3000 Series Carriers.

If there is . . .	Mount the speaker panel . . .
Only one carrier in the cabinet and no SDCP installed	Directly to the carrier in place of the cover plate.
More than one carrier in the cabinet	On a carrier that does not contain the SDCP.
Only one carrier in the cabinet and an SDCP is mounted on the carrier	To the front rail.

To install the speaker panel to the carrier:

▶ Procedure

1. Remove the cover plate.
2. Secure the speaker panel to the front of the carrier using its four captive screws.
3. Use the same screw holes that held the cover plate in place. Go to the *Testing the Speaker Panel* section, page 2-13.

To install the speaker panel to the cabinet's front mounting rails:

▶ Procedure

1. Determine if you want to mount the speaker panel above or below the carrier. See Figure 2-2.
2. Fasten one of the speaker panel mounting brackets to a front mounting rail with a #10 Phillips screwdriver (supplied).

> **NOTE**
>
> If your cabinet has unthreaded rails, first attach a self-retaining nut to the rail hole you intend to use. Then, fasten a bracket to the mounting rail using a supplied #12 screw (the longer Phillips-head screw).

3. Verify the position by holding the panel against the bracket and aligning the panel's captive screws with the bracket's screw post. For appearance, you can adjust the bracket's position to eliminate space between the speaker panel and carrier.
4. Fasten the second speaker panel bracket to the other mounting rail to match the first bracket's position.
5. Once the brackets are installed, use a small flathead screwdriver to tighten the speaker panel's four captive screws to the mounting brackets.

Testing the Speaker Panel

Once the speaker panel is installed, verify that the speaker is working.

▶ Procedure

1. Connect one end of the supplied coiled cable into the speaker panel's jack labeled **Spkr** and the other end into any dial/lease modem's speaker jack labeled **Spkr**.

2. If the cabinet has an SDCP, press Select and enter a valid carrier and slot address for the modem used in Step 1. The **Front Panel** status indicator on the dial/lease modem's faceplate lights, indicating that it is connected to the SDCP.

3. Using the SDCP, scroll the menu until the Control branch appears on the LCD.

4. Access the Control branch and select the Speaker function.

5. Select a speaker setting of Low, Medium, or High and place a call to listen to the dialing sequence.

> **NOTE**
>
> This is only a temporary setting. Upon a reset, the modem returns to its default setting of Medium. To change the default setting, refer to the device's manual.

If you do not have an SDCP installed and are using AT commands, use the **ATM** command to turn the speaker ON and the **ATL** command to adjust the speaker volume.

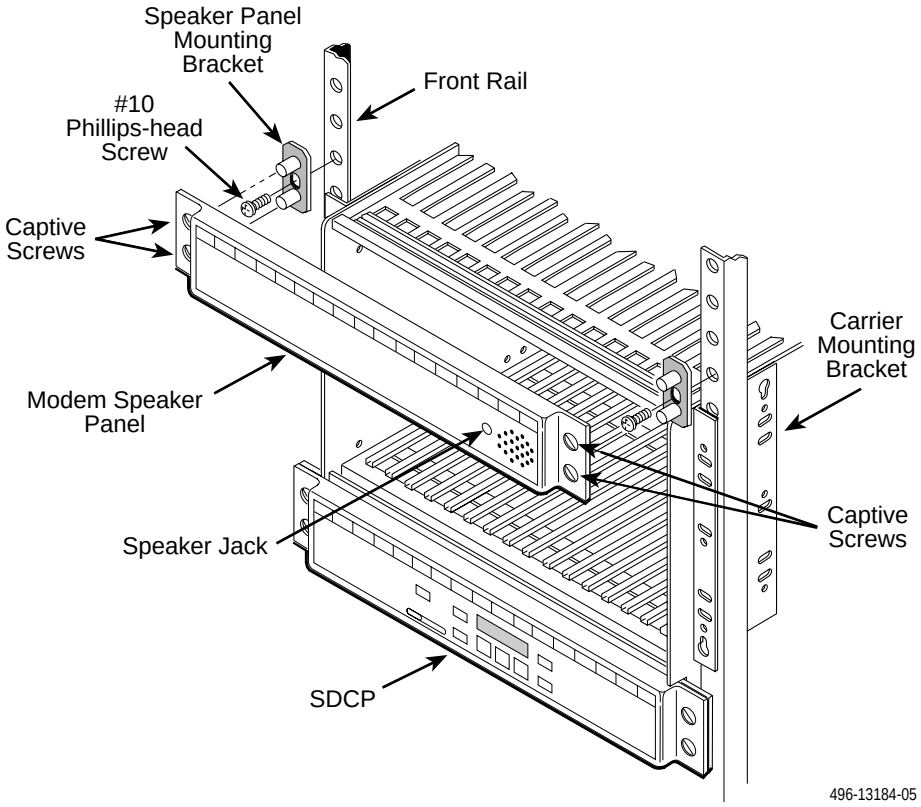
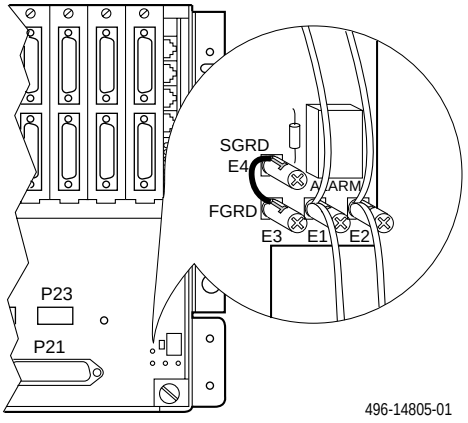


Figure 2-2. Speaker Panel for Dial/Lease Modems

SGRD/FGRD Connection

Grounding reduces interference. To connect frame ground (FGRD) to signal ground (SGRD) for all DSUs and modems in the carrier, install the provided wire strap between the SGRD and FGRD terminals at the rear of the carrier. The terminals are an insulation displacement type, with a slot designed to cut through the insulation on the wire.



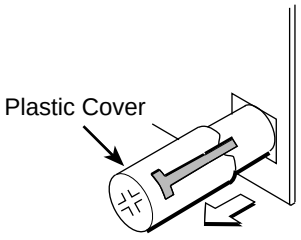
496-14805-01

NOTE

SGRD must not be connected to FGRD when leased modems are installed in the carrier.

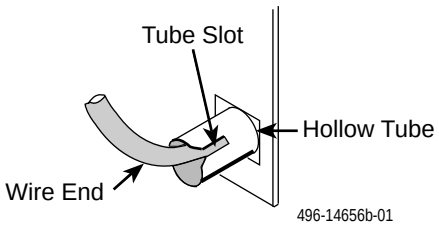
▶ Procedure

1. Use pliers to pull the plastic covers off the SGRD (E4) and FGRD (E3) terminals.



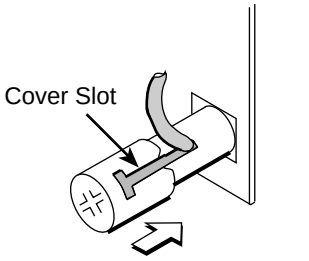
496-14656a-01

2. Insert one end of the strap into the SGRD terminal. It is not necessary to strip the wire.



496-14656b-01

3. Fit the strap into the slot in the terminal. Replace the plastic cap on the terminal, fitting the strap into the matching slot cut lengthwise in the cap.



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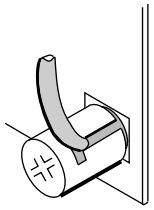
4. Use a Phillips screwdriver to push the cap firmly onto the terminal. As you seat the cap, the terminal cuts through the insulation on the strap and makes contact.



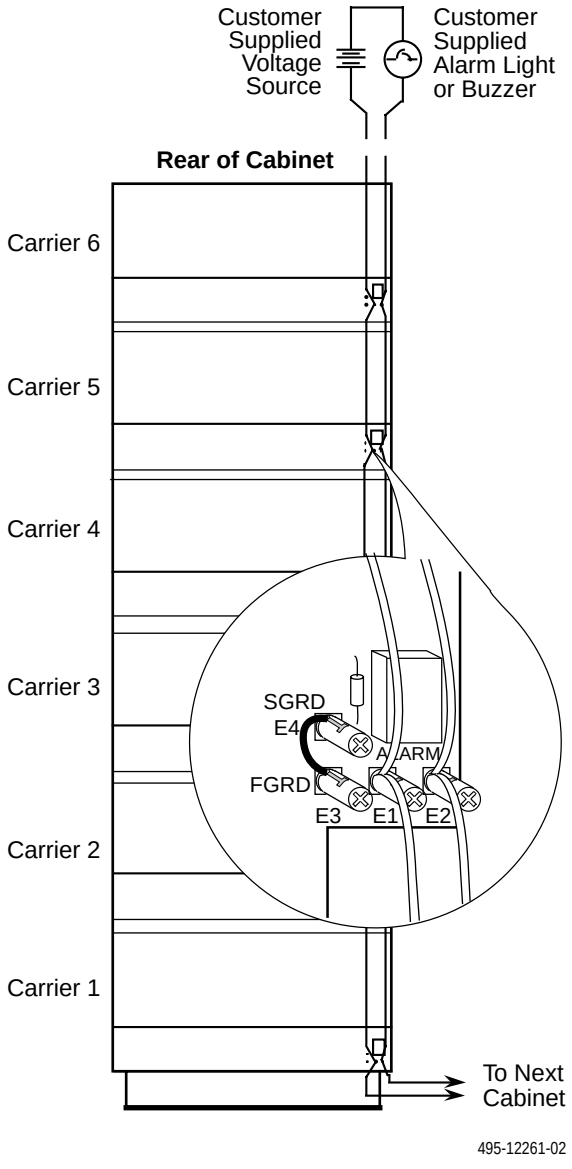
495-14656d-01

5. Insert the other end of the strap into the FGRD terminal and repeat Steps 3 and 4.

Alarm Output Connection

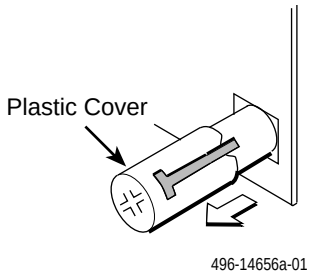
To connect the alarm output to an external light or buzzer:

- Install the alarm light or buzzer and voltage source as described in the instructions received with the light/buzzer and voltage source.
- Use the two ALARM terminals labeled E1 and E2 at the rear of the carrier to install two external device leads.

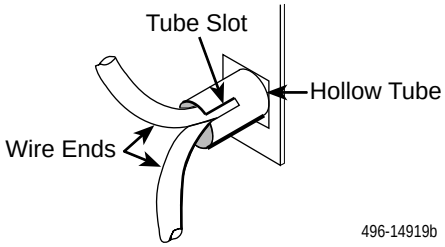


▶ Procedure

1. Use pliers to pull the plastic covers off the E1 and E2 terminals.



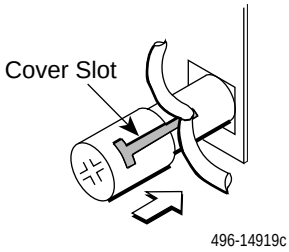
2. Insert the end of the wire coming from the voltage source and the end of a wire to be connected to the next carrier into the E1 terminal. It is not necessary to strip the wires.



3. Fit the wires into the slot in the terminal. Replace the plastic cap on the terminal, fitting the wires into the matching slot cut lengthwise in the cap.

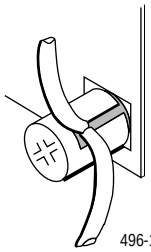
NOTE

The last carrier to be connected has one incoming lead for each terminal.



4. Insert the other end of the wire to the next carrier's E1 terminal, if any. Repeat Steps 2, 3, and 4 until all the carriers are linked together.

5. Use a Phillips screwdriver to push the cap firmly onto the terminal. As you seat the cap, the terminal cuts through the insulation on the wires and makes contact.



6. Insert the end of the wire coming from the alarm and the end of a wire to be connected to the next carrier into the E2 terminal, as described in Step 2.

7. Repeat Steps 3 through 5, connecting the E2 terminals instead, until all the carriers are linked together.

Dial Modem Control Interface

Connectors J1 and J2 are defined in Table A-12 in Appendix A and provide an interface that can be used for:

- **D-lead control signaling**. Directly supported. Associates a signal lead with each modem. Momentary connection of this lead to a common ground activates the signal.
- **MI/MIC signaling**. Supported by connecting all MIC leads together and wiring them to Pin 25 (Signal Ground) on the corresponding J1 or J2 connector. Each MI lead can then be treated as a D-lead connection. Provides two leads:
  - — Mode Indicate (MI)
  - — Mode Indicate Common (MIC) – usually via Pins 3 and 6 of an 8-position modular VF connector

Activation of the signal is by momentary connection of these two leads. These two control signal methods are identical in function. Activation causes the associated dial modem to go off-hook in the Originate mode.

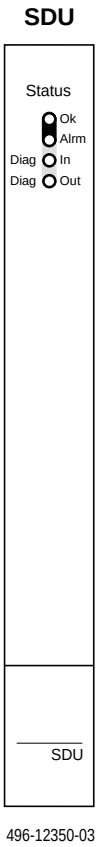
SDU Installation

An SDU is a circuit card designed for installation in the slot at the extreme left end of the carrier (Slot 0). The SDU is required for either or both of the following conditions:

- The devices in the carrier are to be controlled by an NMS.
- Multiple carriers in a cabinet configuration are to be controlled from a single SDCP.

The SDU is not required for a single carrier:

- Without an NMS interface or
- With an SDCP installed.



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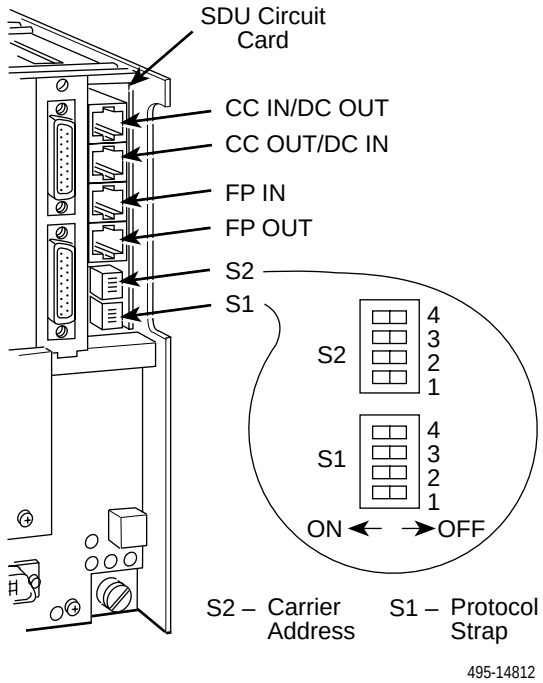
The following table describes the SDU's status indicators.

Label	Color	Description
OK	green	Normal operation.
Alrm	red	Fault in SDU.
Diag In	yellow	Incoming message from the NMS to a DSU, DBM, or dial/lease modem.
Diag Out	yellow	Outgoing message to the NMS from a DSU, DBM, or dial/lease modem.

SDU Modular Jacks and DIP Switches

At the rear of the SDU are four modular jacks:

- CC IN/DC OUT – 6-pin
- CC OUT/DC IN – 6-pin
- FP IN – 8-pin
- FP OUT – 8-pin



Below the four modular jacks are two sets of DIP (dual in-line package) switches labeled S2 and S1.

- **S2:** Each device in a cabinet configuration must have a unique identity. For Model 3611 with software version 3.*nn* and earlier, use the top DIP switch to set the carrier address.
- **S1:** Use the bottom DIP switch for CC or DC operation of the NMS channel.

To set the carrier addresses:

If the device is . . .	Then . . .
Not Model 3611	Enter the address manually from the front panel.
Model 3611 with software version of 4.*nn* or higher	Enter the address manually from the front panel.
Model 3611 with software version of 3.*nn* or lower	Use the following procedure to set the S2 DIP switch for the carrier address.

▶ Procedure

1. Set the carrier address S2-1, S2-2, and S2-3 DIP switches on the rear of the card, as specified in Table 2-2. Note that each carrier in a cabinet must have a unique address. Use Table 2-3 to determine the new carrier's address.

For a . . .	Then . . .
Single carrier	Leave the S2 switch address set for Carrier 1 (factory default).
New cabinet with an NMS control channel	Use the address Carrier 1 for the first carrier, Carrier 2 for the next, and go up to the Carrier 7 and 8 addresses for carriers in the second cabinet in a single installation. For the next installation, the carrier address is numbered 1, but is on a different control channel.
Carrier added to an existing control channel	Use Table 2-3 to determine the new carrier's address.

2. Write the carrier number on the slot label located under each slot on the SDCP or cover plate.

Table 2-2
Carrier Address SDU S2 DIP Switches

S2 DIP Switch	Carrier Number							
	1*	2	3	4	5	6	7	8
S2-4	—	—	—	—	—	—	—	—
S2-3	Off	Off	Off	Off	On	On	On	On
S2-2	Off	Off	On	On	Off	Off	On	On
S2-1	Off	On	Off	On	Off	On	Off	On

* Factory default setting.
On is to the left as you face the rear of the carrier.
Off is to the right.

Table 2-3
Carrier Address Assignment

Highest Existing Network Address		First New Carrier Address
DATAPHONE II	ADp	
11 – 48	01 – 32	2
51 – 88	33 – 64	3
91 – 128	65 – 96	4
131 – 168	97 – 128	5
171 – 208	129 – 160	6
211 – 248	161 – 192	7
251 – 288	193 – 224	8
291 – 328	225 – 256	*

* Start a new control channel when the carrier address reaches this limit.

SDU CC/DC Operation

Set the SDU S1 DIP switch on the rear of the circuit card (Table 2-4).

If connecting to . . .	Then set the . . .
Network control channel	CC IN/CC OUT option
Diagnostic channel of an upstream device	DC OUT/DC IN option

Table 2-4
SDU S1 DIP Switch

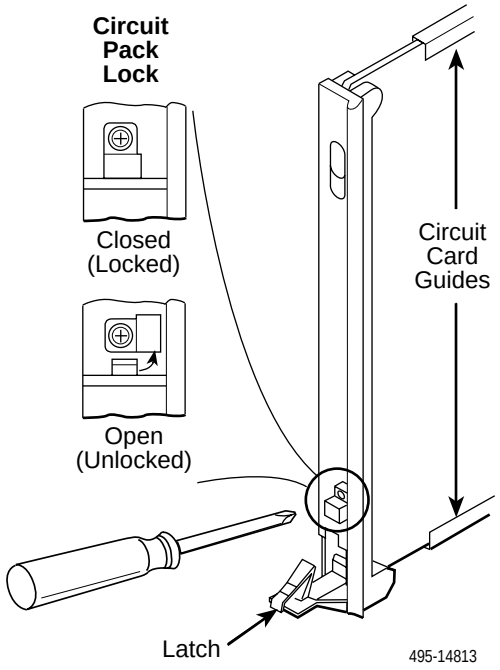
S1 DIP Switch	CC IN/CC OUT*	DC OUT/DC IN
S1-4	—	—
S1-3	—	—
S1-2	Off	On
S1-1	Off	Off

* Factory default setting.
On is to the left from the rear of the carrier.
Off is to the right.

Installing the SDU

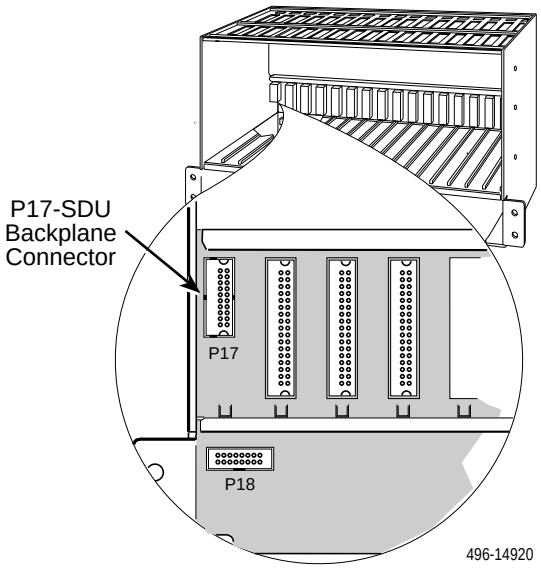
▶ Procedure

1. Using a Phillips screwdriver, loosen the screw holding the circuit pack lock. Rotate the lock to the open position.



2. With the latch in the open position, insert the circuit card into the top and bottom card guides of the slot labeled **SDU**.

3. Slide the SDU circuit card into the slot until the SDU backplane connector is seated firmly in P17.



4. Press the latch to secure the SDU in the carrier. Rotate the circuit pack lock back into the closed position, and tighten the screw.

SDU Front Panel Connection

For a cabinet configuration with multiple carriers, connect all the SDUs in a daisy chain.

▶ Procedure

1. Use an 8-pin modular cable to connect the **FP OUT** jack at the rear of the SDU in one carrier to the **FP IN** jack of the SDU in the next carrier above or below the first connection.

2. Use another modular cable to connect the second SDU's **FP OUT** jack to the next SDU's **FP IN** jack. Continue to the last carrier in the cabinet.

   In the accompanying illustration, Carrier 5 is chained in this way to Carrier 4, 4 to 3, 3 to 2, 2 to 1, and 1 to 6. The 8-pin modular cables are shown as solid black lines.

NOTE

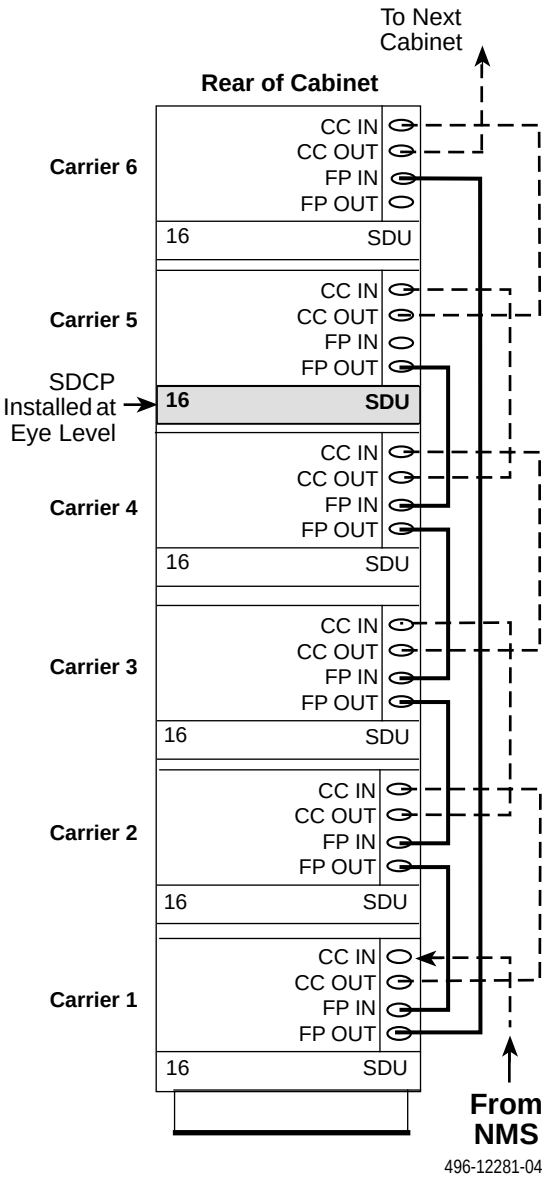
If more than one SDCP is connected in the daisy chain, the first front panel will display data and be operational. The remaining front panels will display Slave on the SDCP.

Testing the SDU

When . . .	Then . . .
The carrier's power transformer unit is operating	All indicators on the SDU's faceplate light briefly as the SDU performs a self-test routine.
The test completes	All indicators go off except the green **OK** indicator.
There is an NMS connection and the devices in the carrier are on the NMS or poll list	The yellow **Diag In** and **Diag Out** indicators also flash periodically as the NMS polls the devices in the carrier.

After installing at least one device in the carrier, check that the SDU is functioning properly by polling selected devices for health and status.

- If there is an NMS connection, poll for health and status. Refer to the *NMS Connection* section.
- If the SDCP is already installed, select each device in turn and request its health and status. Refer to the *Testing the SDCP* section on page 2-12.



NMS Connection

A COMSPHERE 3000 Series Carrier can be connected to a variety of Network Management Systems:

- 6800 Series NMS
- 6700 Series NMS
- DATAPHONE II Diagnostic Controller (DC)

The control channel **CC IN** interface, a 6-pin modular jack on the SDU, connects the NMS to the carrier. Each type of NMS requires a specific adapter to convert the control channel interface to the 6-pin modular jack required for the SDU.

This connection is via the control channel interface on the SDU, but all 16 slots in the carrier can only be controlled by one NMS. One control channel can manage up to eight carriers by daisy chaining from the **CC IN** to the **CC OUT** interfaces on the SDU in each carrier. Some protocols result in **DC OUT** and **DC IN**. Refer to the *SDU CC/DC Operation* section, page 2-18.

> **NOTE**
>
> You cannot use an NMS connected through the SDU with either T1 CSUs or T1 DSU/CSUs.

Connecting the NMS

▶ Procedure

1. Obtain the correct adapter. Refer to Table 2-5, page 2-22. Connect the adapter to the network management port on the NMS device (on the COMSPHERE and DATAPHONE II systems, the port is labeled **DC OUT** or **DC IN**).

2. Use a 6-pin modular telephone cord to connect the modular side of the adapter to the **CC IN** jack on the rear of the SDU in the carrier. In the accompanying illustration, 6-pin modular telephone cords are shown as dashed lines.

3. After at least one device has been installed in the carrier, check that the SDU is functioning properly by polling the device for health and status.

4. For a cabinet configuration with multiple carriers, connect all of the SDUs in a daisy chain, starting with the SDU connected to the NMS.

   — Use a 6-pin modular telephone cord to connect the **CC OUT** jack at the rear of this SDU to the **CC IN** jack of the SDU in the next carrier above or below it.

   — Use another cord to connect the second SDU's **CC OUT** jack to the next SDU's **CC IN**.

   Continue the connections until the last carrier in the cabinet is connected.

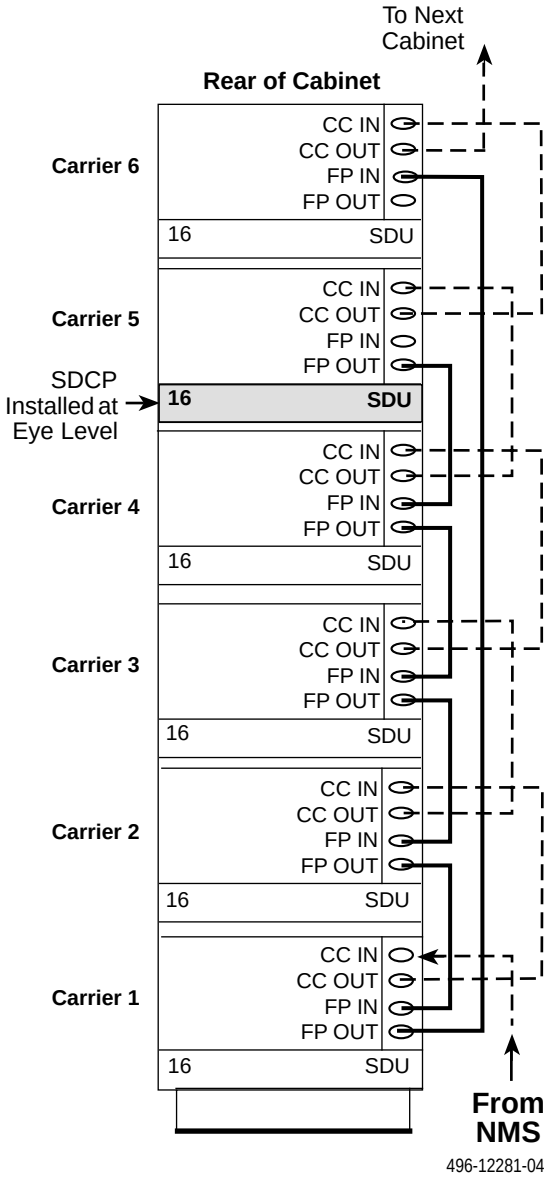


Table 2-5
NMS Carrier Connections

SDU Jack	Connecting To	Using Adapter and Cable Connections*
CC IN/ DC OUT	COMSPHERE 6800 Series NMS	Central Site: Feature 6821-F1-513 includes 4400-F1-594 Adapter and 4400-F1-512 Cable Remote Site: Feature 6821-F1-518 Adapter
CC IN/ DC OUT	COMSPHERE 6700 Series NMS	Cable provided with software package
CC IN/ DC OUT	COMSPHERE Model 3610 DSU	Features 3600-F3-300 Hubbing Device and 4400-F1-51*x* Cable Remote NMS connecting via DSU to carrier: NMS adapter cable Feature 3000-F2-510
CC IN/ DC OUT	COMSPHERE Models 38*xx* and 39*xx* Modems	Features 3600-F3-300 Hubbing Device and 4400-F1-51*x* Cable
CC IN/ DC OUT	Primary Channel Device	Feature 6821-F1-518 Cable
CC IN/ DC OUT	DATAPHONE II Device – CC OUT Connector	Features 4400-F1-591 Adapter, 4400-F1-51*x* Cable, and 10-pin interface 4400-F1-577 Cable
CC IN/ DC OUT	DATAPHONE II Device – DC OUT Connector	Feature 4400-F1-590 Adapter and 4400-F1-51*x* Cable
CC OUT/ DC IN	COMSPHERE Model 3610 DSU	Features 3600-F3-300 Hubbing Device and 4400-F1-51*x* Cable
CC OUT/ DC IN	Primary Channel CC Extension	Features 4400-F1-592 Adapter & 4400-F1-51*x* Cable
CC OUT/ DC IN	DATAPHONE II Device – CC IN Connector	Feature 4400-F1-576 Cable
CC OUT	DATAPHONE II Device – DC IN Connector	Feature 4400-F1-589 Cable

***** 6-Pin Modular Cable Lengths for Feature 4400-F1-51*x:*
4400-F1-510 = 3′
4400-F1-511 = 10′
4400-F1-512 = 25′

T1 Auxiliary Backplane 3

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T1 Auxiliary Backplane Installation

Mount the T1 auxiliary backplane assembly on either side of the carrier to cover Slots 1–8 or 9–16.

NOTE

If modular DSUs or dial/lease modems with "gold finger" contacts are installed in the carrier, mount the T1 auxiliary backplane over Slots 9–16, or Slot 9 will become unusable.

When installing two T1 auxiliary backplanes on a carrier, use a diagnostic channel extension cable to connect them together. For more information about this cable, refer to Appendix B, *T1 CSU and T1 DSU/CSU Interface Connectors*.

NOTE

Once installed, the T1 auxiliary backplane extends down into the Network Interface Module (NIM) area of the carrier. The extension of the backplane displaces a NIM card and prohibits the use of dial modems in any slot covered by the T1 auxiliary backplane assembly.

Preinstallation Preparations

You will need the following tools:

- Phillips screwdriver
- Long-nose pliers
- 1/4″ nut driver
- 5/16″ nut driver

WARNING

Turn off the power to the 3000 Series Carrier before you install the T1 auxiliary backplane.

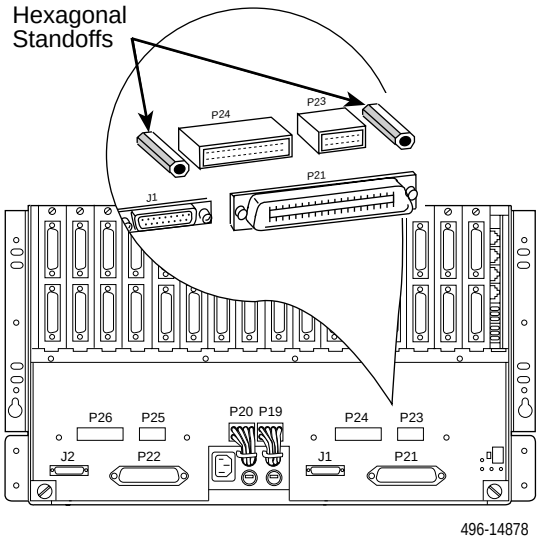
▶ Procedure

1. Remove the power transformer unit from the front of the 3000 Series Carrier. Refer to the *Power Transformer Unit Installation* section in Chapter 2.

2. Remove the NIM, if present, from the back of the 3000 Series Carrier. Refer to the *NIM Installation* section in Chapter 4.

3. Remove the two hexagonal standoffs:

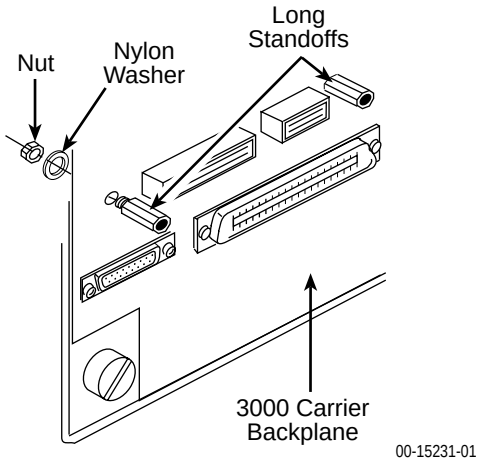
If the T1 auxiliary backplane will be mounted over . . .	Then use the 1/4″ nut driver to remove the two hexagonal standoffs from either side of . . .
Slots 1–8	Connectors P23 and P24
Slots 9–16	Connectors P25 and P26



Installing the T1 Auxiliary Backplane

▶ Procedure

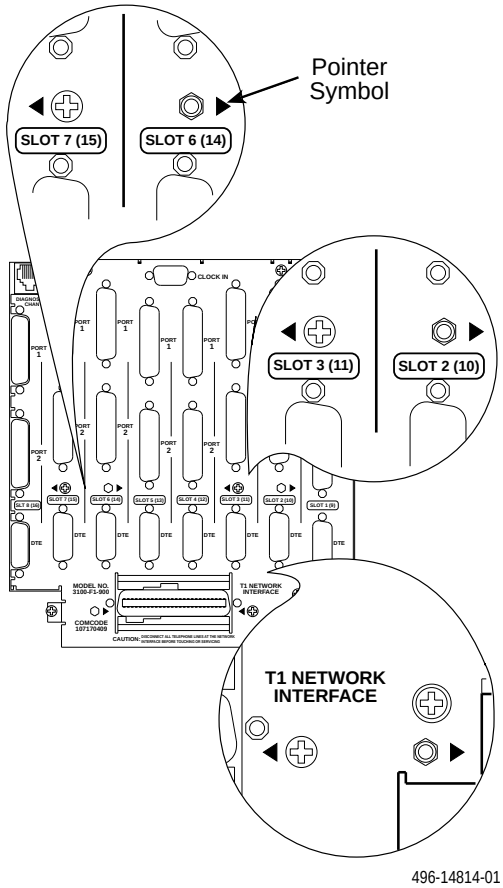
1. On the side you will install the auxiliary backplane, install No. 5 nuts, nylon insulating washers, and long hexagonal standoffs. Tighten the assembly with 5/16″ and 1/4″ nut drivers.



2. Determine the screw holes in which to mount the T1 auxiliary backplane.

   The backplane has pointer symbols next to the center and bottom rows of screw holes.

If mounting the backplane on the . . .	Then use the . . .
Right side of the rear of the carrier	Two screw holes with the pointers facing to the right ▶.
Left side of the rear of the carrier	Use the holes with the pointers facing left ◀.

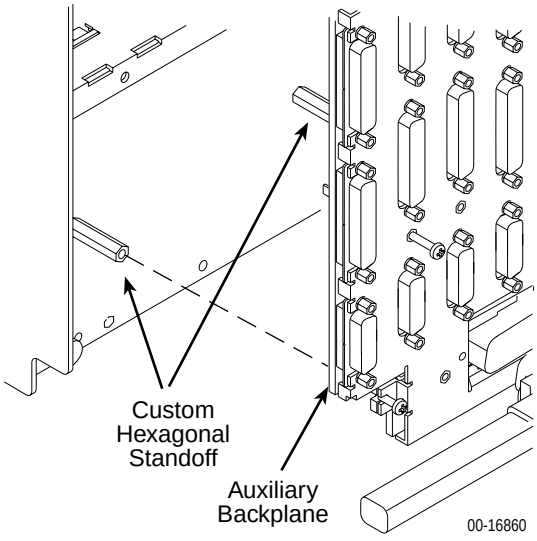


   For the top row, use the same screw holes for mounting on either side.

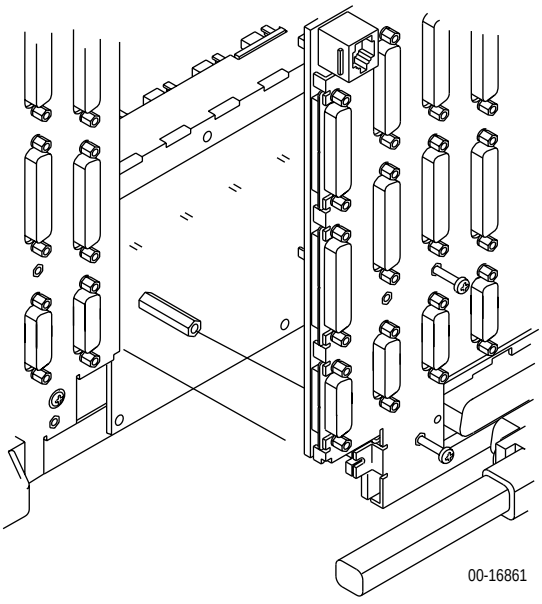
3. Align the backplane at the bottom and the corresponding holes on the bottom row of the backplane.

4. Insert and finger-tighten the two bottom row screws.

   If you are mounting the backplane on the left side, insert the small 3/8″ screw into the open slot at the lower left side of the backplane. Use 3/4″ screws for the other bottom hole, and for both bottom holes of a backplane mounted on the right side.



Backplane Mounted on Left Side



Backplane Mounted on Right Side

5. Insert and finger-tighten the two top row screws and the two center row (1″ long) screws.

6. Using a screwdriver, tighten all the screws. Do not use excessive force.

Installing the T1 Network Cable Retainer

▶ Procedure

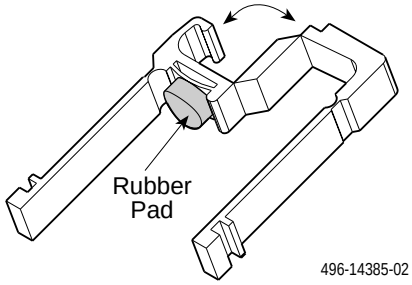
1. Ensure that the T1 network cable retainer's rubber pad is properly attached to the black plastic. This plastic cable retainer secures the T1 connecting cable once it is plugged in.

> **NOTE**
>
> Do not install the cable retainer if you will be installing a Telco connector cable with a straight cable entry. Instead, secure this cable using the screw lock provided on each side of the T1 network connector.

2. To install the T1 network cable retainer:

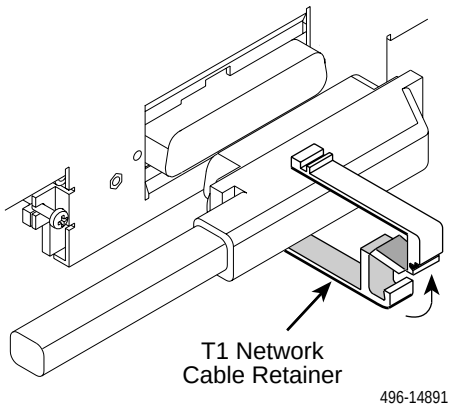
   — Insert one slotted leg, with the grooved slot facing outward, into the larger recessed slot at the bottom of the T1 connector, and

   — Slide it toward the center.

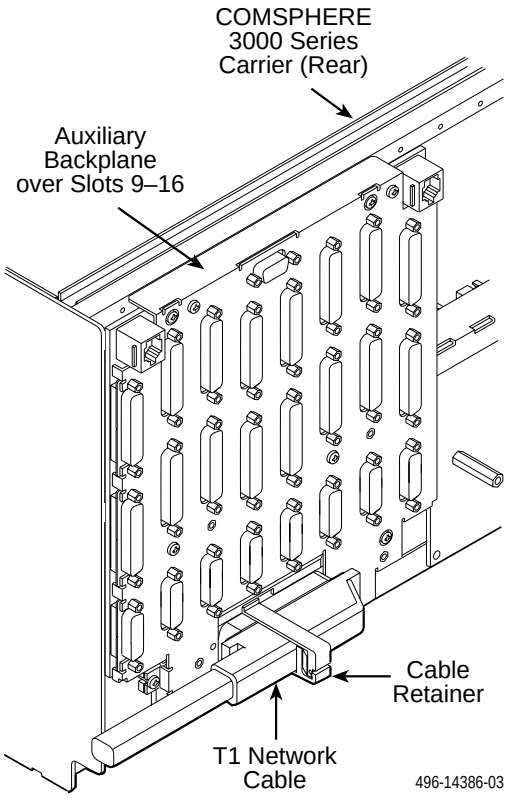


3. Insert the other leg of the cable retainer (with the groove on top) into the larger recessed slot, then slide it toward the left.

4. To open the cable retainer, insert a flathead screwdriver into the slot on the top and pry it open. The retainer unfolds, allowing connection of the cable.



5. To lock the retainer in place, refold and snap it down over the top of the connector cable.



T1 CSU and T1 DSU/CSU Network Interface

The T1 auxiliary backplane, installed over either Slots 1–8 or Slots 9–16 at the back of a 3000 Series Carrier, provides the interfaces for T1 CSUs and/or T1 DSU/CSUs to a T1 network.

The T1 CSU and T1 DSU/CSU network interface is provided by one 50-pin connector on the T1 auxiliary backplane on the back of the carrier. This connector serves eight contiguous slots in the carrier: either Slots 1–8 or Slots 9–16.

Depending on your configuration, use one of the following schemes for the T1 CSU and T1 DSU/CSU network interface.

If a 50-pin cable is . . .	Then . . .
Attached to a 66A punchdown block	Hardwire the circuits to the block.
Plugged into a feature 3100-F1-930 adapter cable, which provides 8 non-keyed modular plugs using Pins 1, 2, 4, and 5	Connect the T1 CSU or T1 DSU/CSU to a standard network interface.

The network interface cable can be connected to additional network interface cables, up to the maximum of 100 feet.

To connect the T1 CSU and T1 DSU/CSU network interface:

▶ Procedure

1. Connect the network cable to the carrier.
2. Choose one of the following:

If you are using . . .	Then . . .
The Telco connector cable	Install the black plastic network cable retainer.
A straight-in connector	Use a small screwdriver to engage and tighten the screws.

3. Connect the individual cables with 8-pin modular plugs into the adapter for each T1 line.

T1 CSU DTE Port

The T1 auxiliary backplane provides a DB15 socket connector for each CSU. The DTE cable is normally supplied by the DTE vendor. For more information, see the *ACCULINK 3150 and 3151 CSU Operator's Guide*.

T1 DSU/CSU DTE Ports

The T1 auxiliary backplane provides connections for a DSX-1 drop/insert port and two synchronous data ports for each DSU/CSU.

The drop/insert interface is a DB15 socket connector.

The synchronous ports may be used for the following interfaces:

- EIA-530-A
- V.35
- RS-449
- X.21

The interface is determined by the cable and adapter used, and the Port Type configuration option selected. See Appendix D, *Equipment List*, and the Port Configuration Options table in the *ACCULINK 3160, 3161, 3164, and 3165 DSU/CSU Operator's Guide*.

V.35 Adapters

In applications where V.35 adapters are used on both data ports, do not use a short V.35 adapter plug for both ports. Use a V.35 adapter cable (feature 3100-F1-570) for the second DTE port. Otherwise it may be impossible to fasten the connectors.

SNMP LAN Adapter Connectivity

The T1 DSU/CSU can be configured to provide SNMP connectivity to an NMS using an external LAN (Local Area Network) adapter. The SNMP LAN Adapter is an interface device that allows SNMP managed devices to be connected to Ethernet or Token Ring LANs. For further details, refer to:

- Appendix D, *Equipment List*.
- The *ACCULINK 3160, 3161, 3164, and 3165 DSU/CSU Operator's Guide*.

T1 COM Port Connection to an External PC

Communication between the T1 CSUs and T1 DSU/CSUs in a 3000 Series Carrier and an external PC occurs through a shared communication (COM) port. The PC can be attached locally or through an external modem.

- T1 CSUs and T1 DSU/CSUs do not have their own COM port for external access. One of the T1 devices in the carrier must be selected as the master communication port.
- The selected T1 device provides the COM port for all the T1 CSUs and T1 DSU/CSUs in the carrier.
- The T1 device is configured, via COM port configuration options, so that Port 2 on the T1 auxiliary backplane is the COM port for the carrier.
- Using the front panel emulation (FPE) diskette, the attached PC can then access any device in that carrier through the shared COM port on the master communication unit.

The figure below shows the COM port adapter.

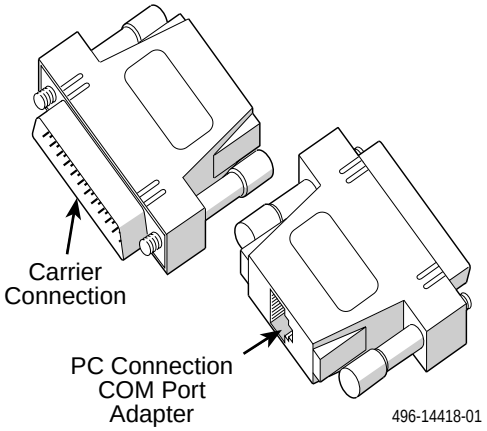


Figure 3-1 shows the adapter cable used on the T1 auxiliary backplane to make the COM port connection for the master communication unit.

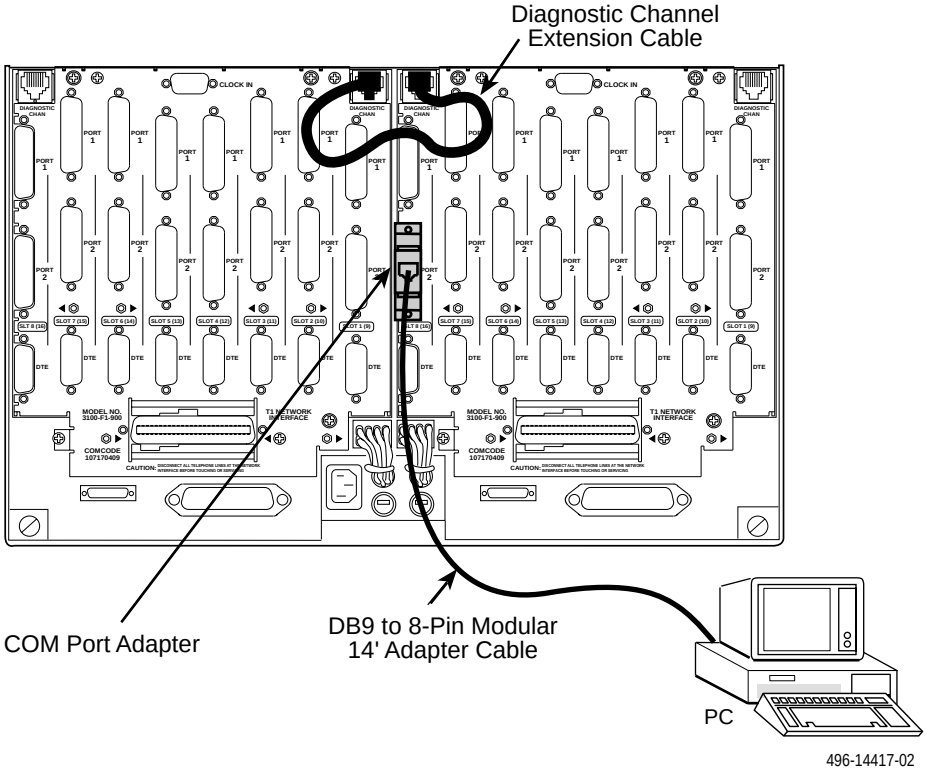


Figure 3-1. T1 COM Port Adapter and Cable with PC Attached

Connecting to the Network 4

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Overview

This chapter describes the following:

- Arrangement of devices in the carrier
- Types of network interface connectors
- Network interface installation procedures

Device Arrangements in the Carrier

Verify that all devices installed in each half of the carrier have compatible interfaces.

You can populate COMSPHERE 3000 Series Carriers in the following configurations:

- All the same devices:
  - — All DSUs and DBMs, except 4-wire Switched 56 kbps DBM
  - — Dial/lease modems
  - — T1 CSUs and T1 DSU/CSUs
- Devices split within the carrier (all dial/lease modems in Slots 1–8 and all DSUs in Slots 9–16)
- Devices mixed within the same half of the carrier (e.g., five dial/lease modems and three DSUs)

Mixing Devices in a Carrier Half

When devices are mixed, such as DSUs with dial/lease modems, it is recommended that they be clustered together in a carrier half. A carrier half is either Slots 1–8 or Slots 9–16. From the front of the carrier, install dial/lease modems starting with Slot 1.

If you populate the same carrier half with all . . .	Then use a . . .
Dial/lease modems, DSUs, and DSUs with ISDN, 2-wire switched 56 kbps, or V.32 analog DBM	Permissive DDD NIM.
DSUs with programmable V.32 analog DBM	Programmable DDD NIM.
DSUs with 4-wire switched 56 kbps backup capability	4-wire switched 56 kbps NIM.
Triple-modem circuit cards	24-port interface connector and 24-port NIM.
T1 CSU and T1 DSU/CSU	T1 auxiliary backplane.

NOTE

Dial/lease modems which use the 24-port NIM must not be installed with DSUs in the same half of the carrier.

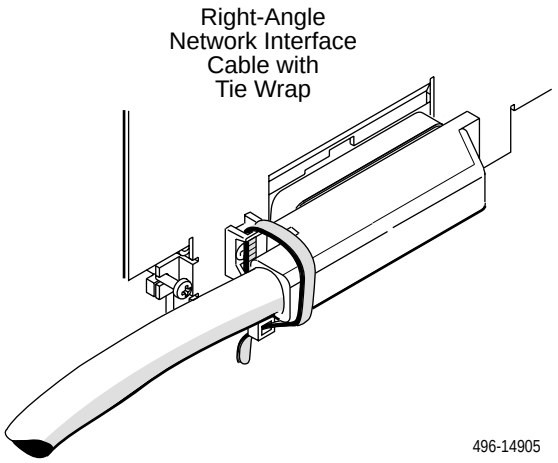
Network Cables

Table 4-1 shows the network cables available. Figure 4-1 illustrates several network cabling connections. Network cables are used for NIM connections, network connections (P21 and P22), and the T1 auxiliary backplane network connections. The straight-in network interface cable is recommended as no cable tie wrap is required. When using the right-angle cable, use the tie wrap as shown below.

The T1 auxiliary backplane network cable is attached with a T1 network cable retainer. Refer to the *Installing the T1 Network Cable Retainer* section of Chapter 3 for details.

Table 4-1
Network Cabling Connectors

Straight-in Network Cable	Right-angle Network Cable
10′ – Feature 3000-F1-013	10′ – Feature 4400-F1-501
30′ – Feature 3000-F1-014	30′ – Feature 4400-F1-504



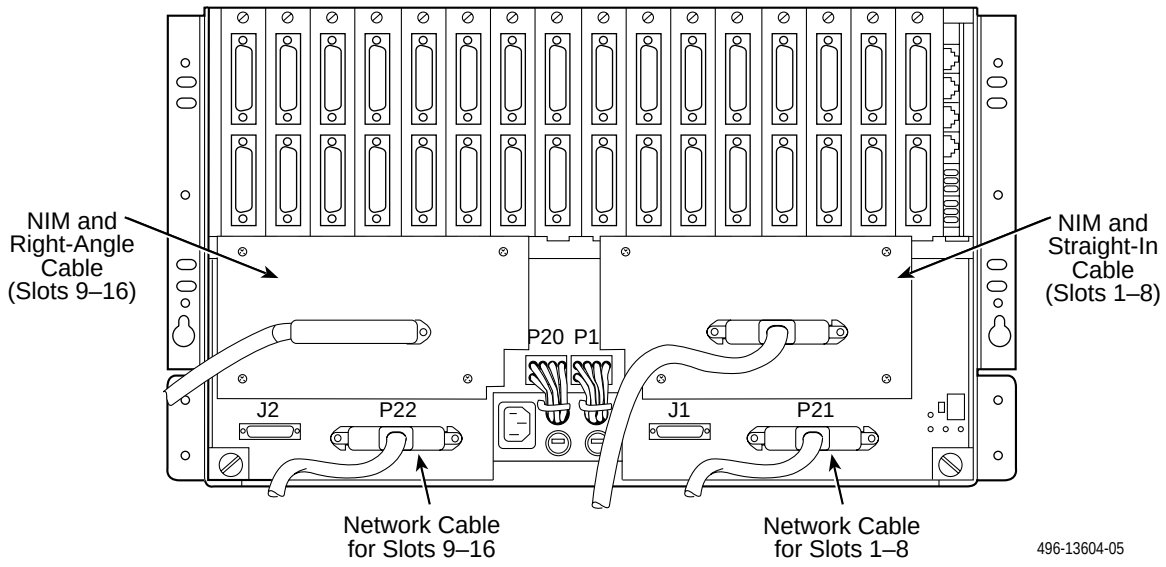


Figure 4-1. NIM and Cables Example

Interface Connectors

The methods for providing network connection for devices in the carrier are:

- Via two 50-pin digital network or leased-line interface connectors to the following:
  - — DDS (Digital Data Service)
  - — LADS (Local Area Data Set)
  - — Analog leased-line networks
- Through Network Interface Modules (NIMs) to the following:
  - — Dial network
  - — ISDN
  - — 2-wire switched 56 kbps
  - — 4-wire switched 56 kbps
- Using one 50-pin connector on the T1 auxiliary backplane for T1 CSUs or T1 DSUs/CSUs.

Digital or Analog Leased-Line Network Interfaces

Use one of the following for the digital/analog leased-line interfaces:

If a 50-pin cable is attached to . . .	Then . . .
A 66A punchdown block	Hardwire the circuits to the block.
A RJ48T-type network interface adapter cable, feature 3600-F2-503, which allows from 1 to 12 DDS circuits to be placed on the 50-pin connector	Tell the service provider that only the first 8 circuit positions are used in each 50-pin connection. Do not use a leased-line modem in the same carrier half.
An adapter cable, feature 3600-F2-503, to provide 8 keyed modular connectors using Pins 1, 2, 7, and 8	Connect the DSU to a standard DDS network interface (RJ48S); provides a JM8-style leased-line modem connection. Only mix DSUs and leased-line modems if the analog leased-line network interface is a JM8.
An adapter cable, feature 3000-F1-009, with eight 6-pin modular plugs	Only use for a DDS/leased-line (Canada).

Use the following procedure for digital network or analog leased-line interface installation.

▶ Procedure

To install in . . .	You . . .
The U.S. DDS network	Connect the network cables, feature 3600-F2-503 (50-pin mass termination line cable), to the carrier.
Canada DDS network	Use the provided special network interface adapter cable, feature 3000-F1-009.

1. Use a small screwdriver to tighten the screw.
2. Attach a cable tie to the cable near the hood of the carrier's cable-tie attachment point. If a "straight-in" cable is used, disconnect the cable tie, remove the screw and cable tie mount, and fasten the cable with two screws.
3. Connect the individual cables with 8-pin modular plugs into the adapter for each DDS line.

Network Interface Module (NIM) Connectors

NIMs are installed over the connectors labeled P23 and P24 (right side) or P25 and P26 (left side). The NIMs provide the interfaces for dial backup modules and dial/lease modems to the following:

- Dial network (PSTN)
- ISDN network
- 2-wire or 4-wire switched 56 kbps digital service

NIMs have the following characteristics:

- Two different NIMs can be mounted onto the carrier and be independent of one another.
- Each NIM serves eight contiguous slots in the carrier:
  - — One NIM for Slots 1–8 and
  - — One NIM for Slots 9–16
- Each NIM determines the operating characteristics of the interfaces to the eight slots it serves.

Dial Network Interface

Two optional NIMs on the back of the carrier both provide the direct distance dialing (DDD) network interface.

Depending upon your configuration, use one of the following for a dial/dial backup interface:

- An RJ21X (permissive) 50-pin connector, or
- An RJ27X (programmable) 50-pin connector

The two NIMs can be different types and operate independently of one another. Appendix A provides pin assignments. Additional features available for both programmable and permissive NIMs are:

- **Service Line.** Permits an extra dial line to be connected to the carrier. NIMs with this feature have two Service Line modular connectors, which can be used in sharing a single dial line between:
  - — Two halves of the carrier (Slots 1–8 and Slots 9–16) and
  - — Multiple carriers.
- **Make Busy.**

Check that the dial/lease modem's leased-line connection occurred on the proper pins. If not, a cross-connection may be required at the network interface.

If a 50-pin cable is attached to a . . .	Then . . .
66A punchdown block	Hardwire the circuits to the block.*
Permissive DDM NIM to connect to an adapter cable, feature 3600-F2-505	Install only DSU/DBM devices in the Permissive mode in that half.
Programmable NIM to connect to an DDD adapter cable, feature 3600-F2-504	Configure all devices to the dial lines as a programmable connection in that half.
Programmable NIM to connect to a DDD adapter cable, feature 3600-F2-504	Install only DSU/DBM devices in the Programmable mode.
RJ21X (permissive) or RJ27X (programmable) dial network interface arrangement provided by the dial service provider	Verify that the first eight lines are wired in each 50-pin connector.
* The connection type is defined by the NIM installed in that half of the carrier.	

ISDN and 2-Wire Switched 56 kbps Network Interface

An optional 2-wire switched 56 kbps NIM, which has a 50-pin connector on the back of the carrier, provides the switched 56 kbps digital permissive NIM for ISDN, 2-wire switched 56 kbps, and analog service. See Appendix A for pin assignments.

Depending upon your configuration, use one of the following interconnection schemes available for a 2-wire switched 56 kbps network interface:

If a 50-pin cable from a RJ21X NIM is . . .	Then . . .
Attached to a 66A punchdown block	Hardwire the circuits to the block.*
Connected to a feature 3600-F2-505 adapter cable	Install only ISDN and 2-wire switched 56 kbps devices in that half.
* The connection type is defined by the NIM installed in that half of the carrier.	

NOTE

Do not insert a 2-wire switched 56 kbps plug into an RJ11C jack, which is intended for analog PSTN devices. Plugging into an RJ11C jack may cause equipment damage and harm to the telephone network.

4-Wire Switched 56 kbps Network Interface

An optional 4-wire switched 56 kbps NIM, which has an SJA57-type connector on the back of the carrier, provides the 4-wire switched 56 kbps digital network interface. Appendix A provides pin assignments.

Depending upon your configuration, use one of the following interconnection schemes available for a 4-wire switched 56 kbps network interface:

If a 50-pin cable is . . .	Then . . .
Attached to a 66A punchdown block	Hardwire the circuits to the block.*
Plugged into a feature 3600-F2-503 adapter cable, which provides 8 keyed modular connectors using Pins 1, 2, 7, and 8	Connect the DSU to a standard DDS network interface and provide the 4-wire switched 56 kbps digital connection for the DSU and 4-wire switched 56 kbps DBM.
* The connection type is defined by the NIM installed in that half of the carrier.	

NIM Installation

To install the NIM providing the dial interface for the DBMs, dial/lease modems, or the switched 56 kbps network interface for the ISDN, 2-wire, or 4-wire switched 56 kbps DBM:

▶ Procedure

1. Start with Slots 1–8.
2. Seat the NIM on connectors P23 and P24 on the rear of the carrier (Figure 4-2).
3. Use the four screws provided with the module to secure it to the carrier.
4. Connect a 50-pin mass termination line cable to the module. Secure the cable with the cable tie that is provided.
5. Choose one of the following:

If you have a . . .	Then connect the line side of the cable to the . . .
Dial interface	Dial circuit terminations assigned to the DBMs and dial/lease modems in carrier Slots 1–8.
Switched 56 kbps network interface for 2-wire switched 56 kbps, ISDN or analog	2-wire switched 56 kbps circuit terminations assigned to the switched 56 kbps DBM in carrier Slots 1–8.
NIM with two 6-position Service Line modular connectors for dial/lease modems	Proper dial line or NIM modular connector. The modular plugs are labeled 1–8, and correspond to the devices in carrier slot positions.

6. To install the NIM for any DSUs, DBMs, or dial/lease modems to be installed in Slots 9–16, repeat Steps 1 through 5. Seat the NIM on connectors P25 and P26 on the rear of the carrier.

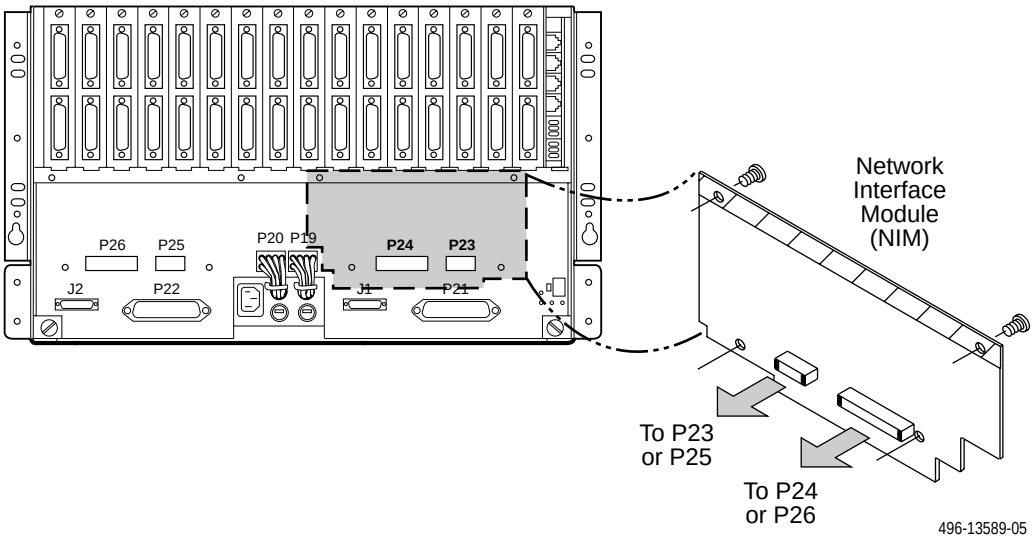


Figure 4-2. Network Interface Module Installation

Installing the 24-Port NIM

The 24-port NIM includes a NIM cover and cable.

▶ Procedure

1. Fasten the NIM to the carrier with the four standoffs provided. See Figure 4-4.
2. Position the NIM cover over the NIM.
3. Fasten the NIM cover in place with the four screws provided.

Cabling the 24-Port NIM

Connect one end of the short ribbon cable to the 50-pin connector at the bottom of the NIM. Connect the other end to P21 (on the right side of the carrier) or P22 (on the left side of the carrier). See Figure 4-3. Connect a network interface cable to the 50-pin connector in the middle of the NIM.

If a 50-pin cable is . . .	Then . . .
Attached to a 66A punchdown block	Hardwire the circuits to the block.
Plugged into a feature 3821-F1-500 adapter cable	Connect the 24 RJ11C 6-pin cables.

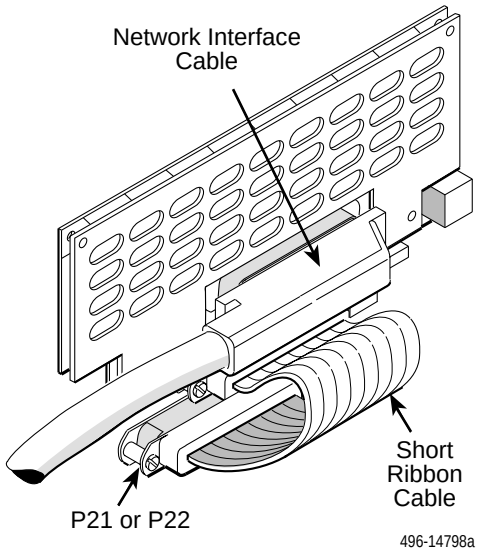


Figure 4-3. Cabling the 24-Port NIM

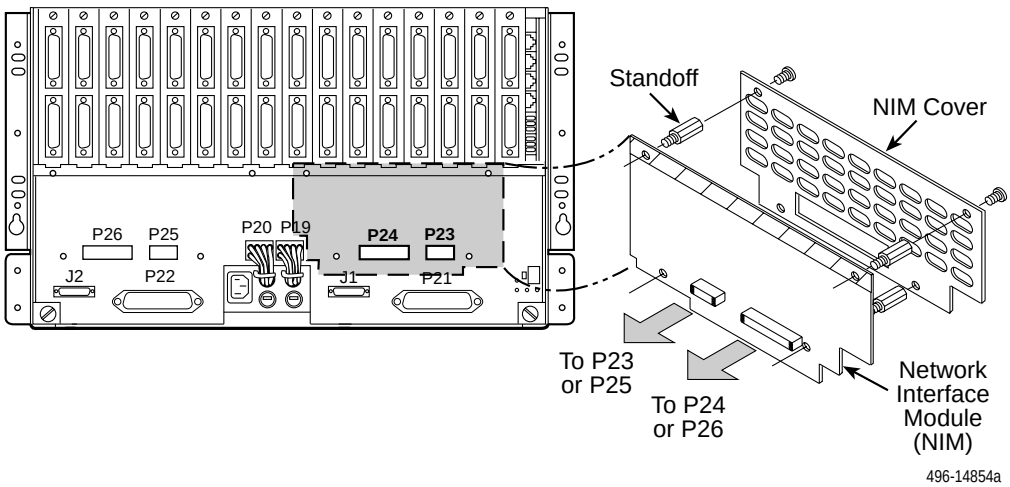


Figure 4-4. Installing the 24-Port NIM

Circuit Card Installation 5

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Filler Panel Installation 5-8
Ferrite Choke Installation 5-8

Overview

This chapter describes installation instructions for the following device types:

- Modular circuit cards:
  - — DSUs
  - — DSU/TDMs
  - — DSU/MCMPs
  - — Dial/lease modems
- T1 CSUs
- T1 DSU/CSUs

Preinstallation Inspection

Check the circuit card for physical damage. For modular circuit cards:

- Ensure that the connector pins are not damaged.
- Check the rear connector plate or connector module for damage.
- Check the V.35 adapter for damage.

Report any damage immediately to your shipping representative and also to your service representative.

Before You Begin

Before installing a circuit card, verify that you have:

- Installed any required Network Interface Modules (NIMs).
- Installed a T1 auxiliary backplane for T1 CSUs or T1 DSU/CSUs.
- Changed any required default hardware strap settings (refer to the device's manual).

If you have a . . .	Then go to the . . .
T1 CSU or T1 DSU/CSU	*T1 CSU and T1 DSU/CSU Circuit Card Installation* section on page 5-7.
DSU, DBM, or Dial/lease modem	*Modular Circuit Card Interface Connectors* section on page 5-2.

Modular Circuit Card Interface Connectors

A circuit card requires either a rear connector plate or a connector module to provide DTE interfaces.

Modular circuit cards have ‘‘gold finger” contacts on their rear edge, which allows their removal from the carrier without disturbing the DTE cables.

Modular circuit cards include:

- DSUs, DBMs, and dial/lease modems, which occupy one slot in the carrier, and require a rear connector plate (Figure 5-1).
- DSU card with a MUX card attached, which requires a connector module. The two cards are physically connected and occupy two consecutive slots in the carrier (Figure 5-2).
- Dial/lease modems, which occupy two slots in the carrier and require a multiport connector module (Figure 5-3).

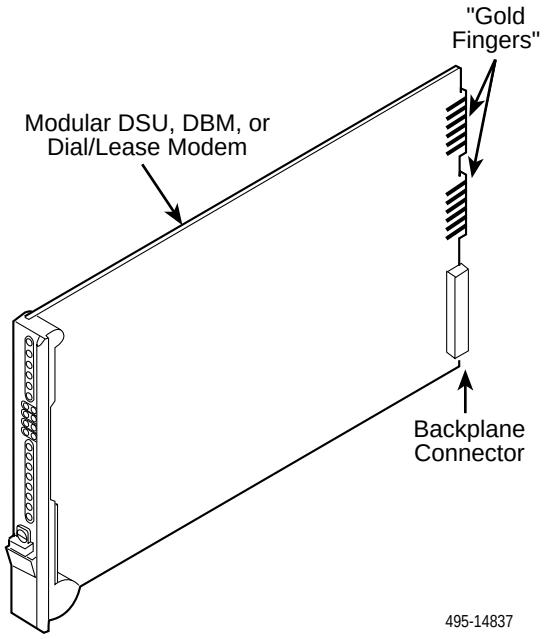


Figure 5-1. Modular Circuit Card

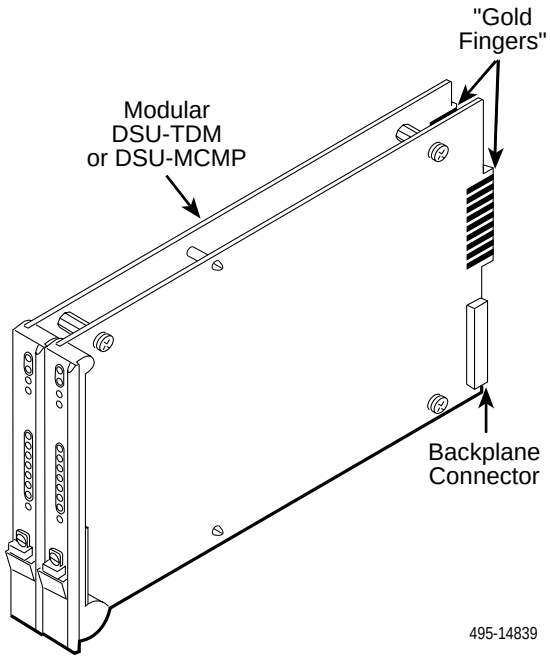


Figure 5-2. DSU with MUX Card Attached

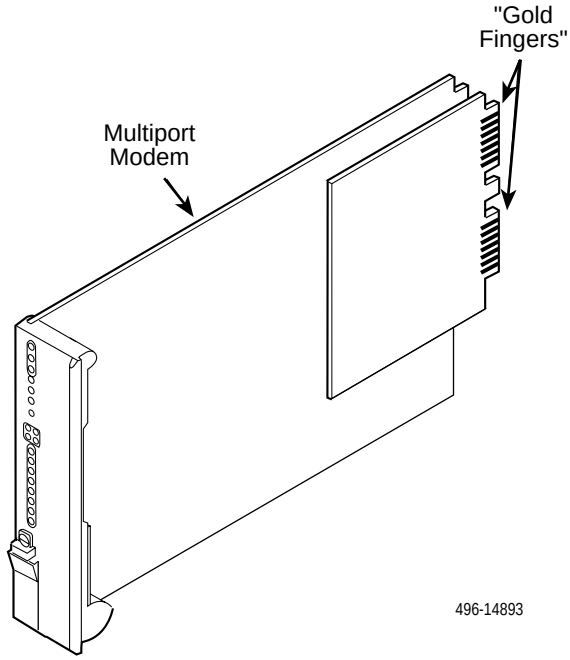


Figure 5-3. Dial/Lease 2-Slot Modem Cards

Rear Connector Plates

- Rear connector plates for single-port devices have two 25-pin DTE connectors:
  - — A 25-pin EIA-232-D/V.24 connector.
  - — A 25-pin ITU V.35 connector, which can be used with a modular DSU V.35 adapter plug or V.35 adapter cable (feature 3000-F1-510). Either adapter converts the 25-pin V.35 interface to the standard 34-pin V.35 interface.
- Rear connector plates for cards with two DSUs have two 25-pin ITU V.35 connectors, and are shipped with two modular DSU V.35 adapters.

Figure 5-4 shows rear connector plates:

- Without a grounding clip (used for DSUs, DBMs, and some dial/lease modems).
- With a grounding clip (used for some dial/lease modems).

Inscriptions on the connector plate may be different from those shown.

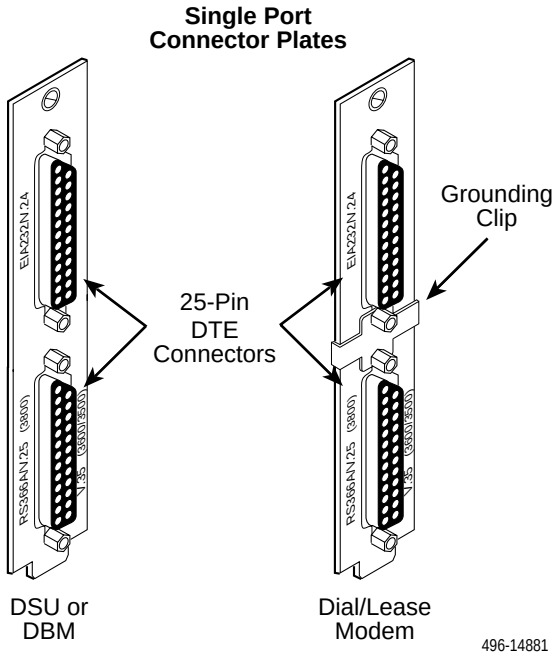


Figure 5-4. Rear Connector Plate with and without a Grounding Clip

Installing a Rear Connector Plate

▶ Procedure

1. At the rear of the carrier, place the tab on the connector plate in the slotted groove on the carrier's backplane. The connector plate must use the same slot position intended for the device.
2. Loosely fasten the screw, allowing for a slight adjustment when installing the device.

The connector plate is installed over a slot on the rear of the carrier (Figure 5-5). Install two rear connector plates over two consecutive slots for dial/lease multiport modems.

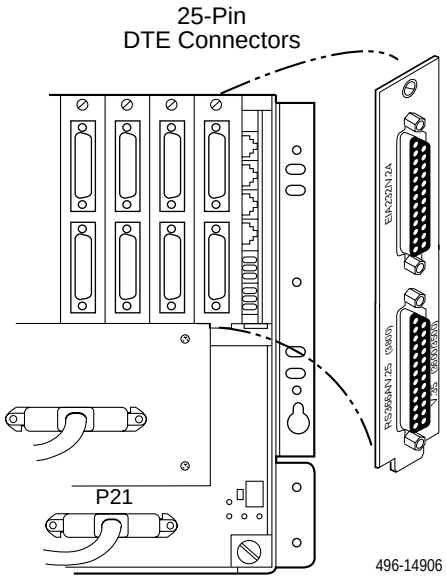


Figure 5-5. Rear Connector Plate Installation

DTE Connector Modules

DSUs with MUX cards and Model 3821*Plus* two-slot triple modem use 6-port connector modules.

A DSU with a MUX card attached uses a rear connector module for six-port TDM or MCMP with the alternate port option (Figure 5-6). The connector module has:

- Six ports; each port is a 25-pin connector which provides the EIA-232 DTE interface.

  The 25-pin connectors can be used with a V.35 adapter plug or V.35 adapter cable (feature 3000-F1-510). Either adapter converts the 25-pin V.35 interface to the standard 34-pin V.35 interface.

- A 26-pin high-density D-type connector at the top, which provides the V.35 interface for either Port 1 or an aggregate data path. Use a 6-port V.35 interconnect cable (supplied by the customer) to convert the 26-pin high-density D-type interface to the standard 34-pin V.35 interface.

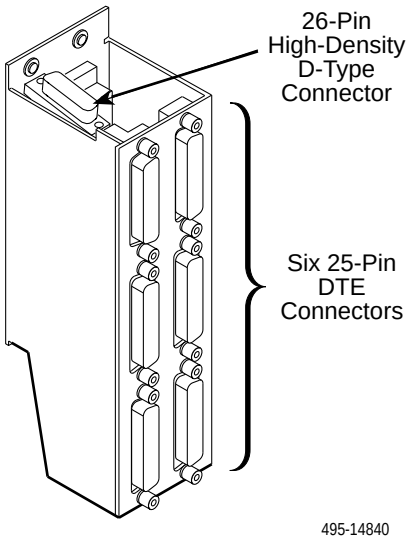


Figure 5-6. DSU with MUX Connector Module

The two-slot triple modem uses a 6-port DTE interface connector module as shown in Figure 5-7. The connector module uses one of the following cables:

- An RS-232 cable with DB25 connectors for each of six ports labeled A, B, and C, or
- An 8-pin modular cable with two DB25 to 8-position modular adapters.

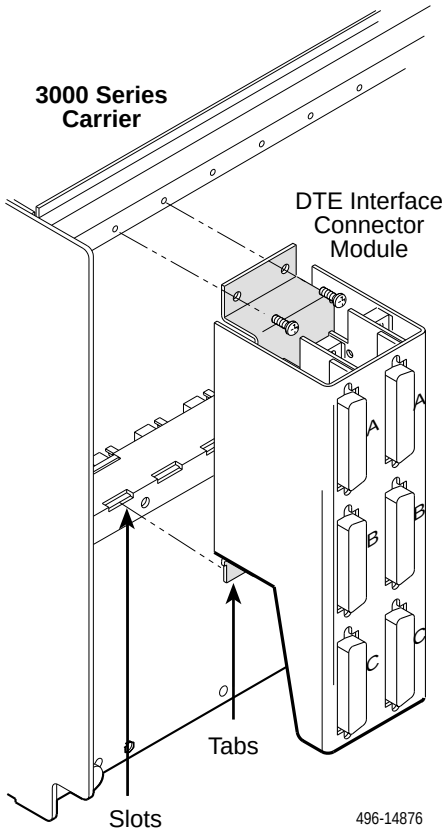


Figure 5-7. Triple Modem Connector Module

Installing a 6-Port DTE Connector Module

▶ Procedure

1. At the rear of the carrier, set the two tabs into the slotted grooves on the carrier's backplane. The connector module must use the same slot positions intended for the device.

> **NOTE**
>
> When installing a DDD NIM and a DSU with a MUX card, install the connector module where it will not interfere with the NIM's J3 and J4 modular connectors.

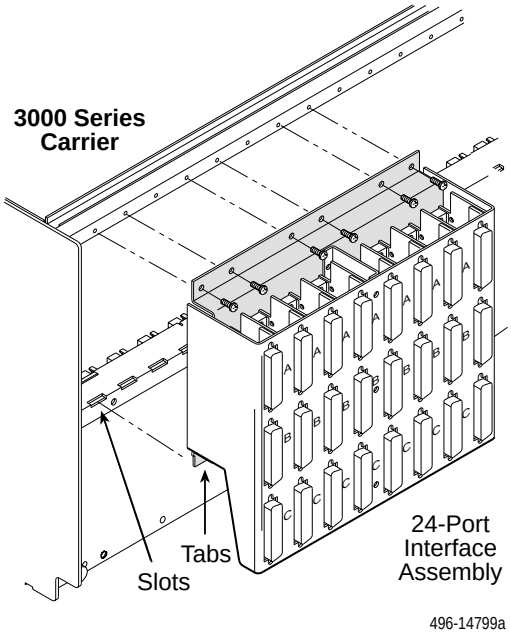
2. Insert the screws provided, but **do not completely tighten them** until the circuit cards are installed. See the *Modular Circuit Card Installation* section, page 5-6.

24-Port DTE Interface Assembly

The eight-slot DTE interface assembly can be mounted on the left or the right side of the carrier. If you are installing only one interface assembly, it must be mounted on the same side as an installed NIM. Refer to the *NIM Installation* section of Chapter 4.

▶ Procedure

1. Feed the eight tabs at the bottom of the DTE interface assembly into the slots on the left or right side of the carrier.



2. Insert the screws provided, but **do not completely tighten them** until the circuit cards are installed. See the *Modular Circuit Card Installation* section, page 5-6.

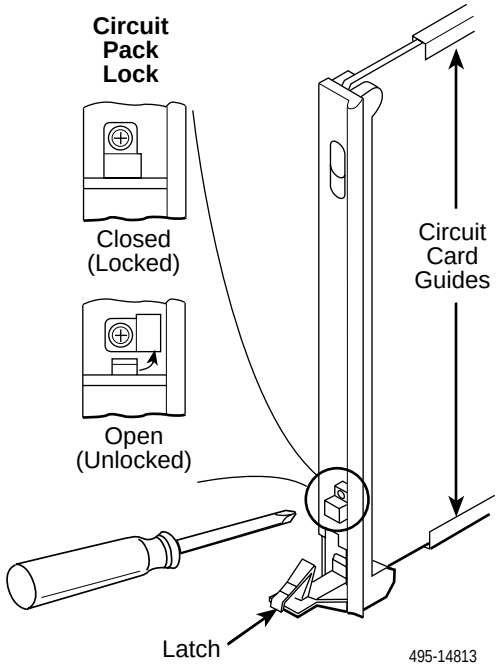
Modular Circuit Card Installation

NOTE

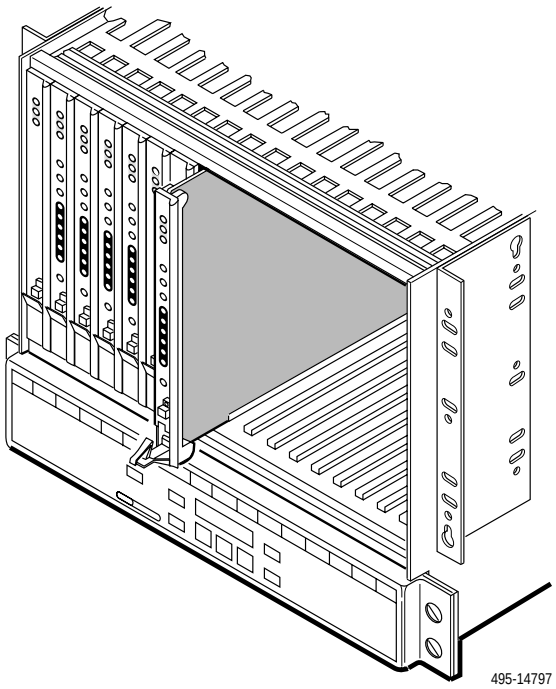
For a DSU with TDM or MCMP, there are two circuit cards with two faceplates that are physically attached. These occupy two slots in the carrier, but are installed as one unit.

▶ Procedure

1. Using a Phillips screwdriver, loosen the screw holding the circuit pack lock. For a DSU with TDM or MCMP, there are two circuit pack locks. Rotate the lock to the open position and open the latch(es).



2. At the front of the carrier, hold the circuit card vertically with the latch on its faceplate in the open position. Then, insert the circuit card into the top and bottom circuit card guides.



3. Slide the circuit card into the slot. Align the rear connector plate, until the connectors seat firmly into the back of the carrier.

4. Press the faceplate latch(es) to secure the circuit card into the rear connector plate.

5. Rotate the circuit pack lock(s) into the closed position, and tighten the screw.

6. If power is applied to the carrier:

   — The unit performs a self-test routine.

   — After several seconds, the circuit card completes its power-up self-test in which all LEDs light.

NOTE

To ensure proper alignment of the circuit card(s) and rear connector plate or connector module, perform Step 7 only during initial installation.

After that, remove or install modular circuit cards from the front of the carrier.

7. Return to the rear of the carrier and tighten either the:
   - — Screw on the rear connector plate, or
   - — Two screws on the connector module.

Verify that the circuit card is firmly seated to ensure a connection with the rear connector plate.

After installing the circuit card, do the following:

- Connect the cables.
- Install the ferrite chokes, if supplied; see *Ferrite Choke Installation* on page 5-8.
- Configure the unit as described in the device's documentation.
- Perform verification testing as described in the device's documentation.

T1 CSU and T1 DSU/CSU Circuit Card Installation

NOTE

Before installing a T1 CSU or T1 DSU/CSU circuit card in a carrier, you must first install a T1 auxiliary backplane. Refer to the *T1 Auxiliary Backplane Installation* section in Chapter 3.

After installing the T1 auxiliary backplane, you are ready to install a T1 CSU or T1 DSU/CSU circuit card (Figures 5-8 and 5-9).

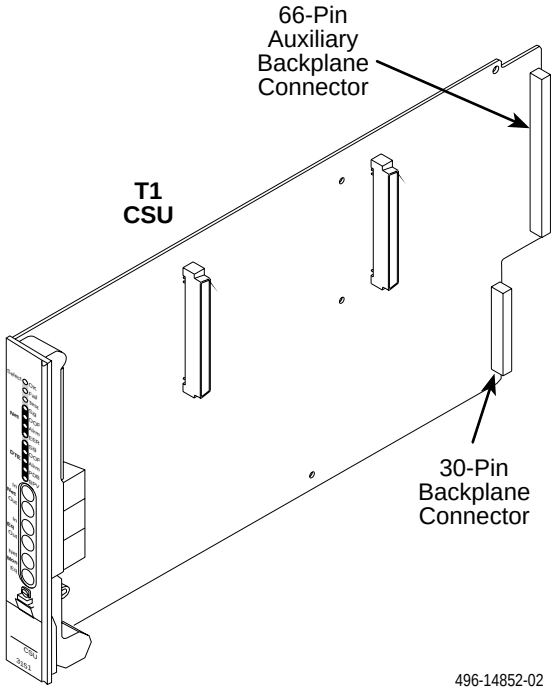


Figure 5-8. T1 CSU Circuit Card

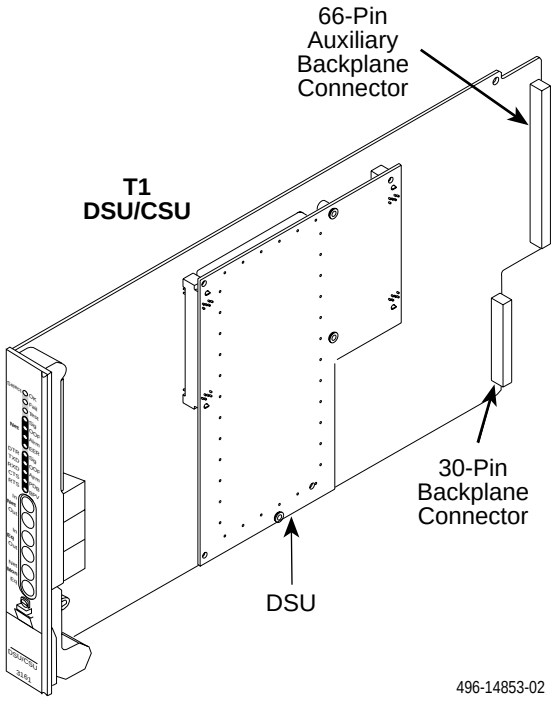


Figure 5-9. T1 DSU/CSU Circuit Cards

To install a T1 CSU or T1 DSU/CSU circuit card:

▶ Procedure

1. Use a Phillips screwdriver to loosen the screw holding the circuit pack lock and rotate the lock to the open position. Open the latch.
2. Hold the circuit card vertically at the front of the carrier, with the faceplate latch in the open position.
3. Insert the card into the top and bottom card guides of one of the slots numbered 1–16.
4. Slide the card into the slot. The ejector latch lifts up as it engages the metal flange.
5. Press the latch up until it clicks into the locked position to secure the circuit card in the carrier.
6. Rotate the circuit pack lock back into the closed position and tighten the screw.

Verify that the circuit card is firmly seated to ensure a connection with the rear connector plate.

Filler Panel Installation

Order and install a filler panel for each unfilled slot in the carrier to ensure compliance with safety requirements. The filler panel is a blank faceplate equipped with:

- An abbreviated circuit card
- A latch to secure it to the carrier
- A circuit pack lock to prevent it from being removed from the carrier without use of a tool

▶ Procedure

1. Use a Phillips screwdriver to loosen the screw holding the circuit pack lock and rotate the lock to the open position.
2. Open the latch.
3. Hold the filler panel vertically at the front of the carrier, with the faceplate latch in the open position.
4. Insert the blank circuit card into the top and bottom card guides of the empty slot, and tighten the circuit pack lock screw.

Ferrite Choke Installation

One ferrite choke is provided with every:

- Model 3511, 3611, and 3616 DSU with a Dial Backup Module (DBM). Attach the ferrite choke to the DTE cable.
- DBM shipped as a separate feature. Attach the ferrite choke to the DTE cable for a carrier installation, and discard it for a standalone unit.

Two or more ferrite chokes are provided with every:

- Model 3000 Carrier assembly with an ac power transformer unit. Attach one ferrite choke to the ac power cord and one to each network cable.
- Model 3611 MUX circuit card. Attach one ferrite choke to each DTE cable.
- Six-Port MUX Adapter module. Attach one ferrite choke to each DTE cable.

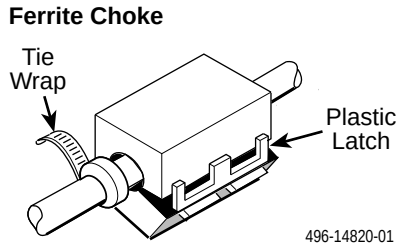
CAUTION

All ferrite chokes that are supplied must be installed following these instructions to ensure compliance with FCC Part 15 Rules.

To install the ferrite choke on the DTE interface, network, or power cable:

▶ Procedure

1. Pull up on the latch to open the ferrite choke.
2. Place the ferrite choke around the cable as close to the cable connector as possible.
3. Close the two halves around the cable and snap the ferrite choke shut.
4. Press down on the plastic latch to secure the ferrite choke in place around the cable.
5. For the ac power cable or other thin cable, secure the ferrite choke in place with a cable tie wrap.



Refer to Figure 5-10 for examples of installed ferrite chokes.

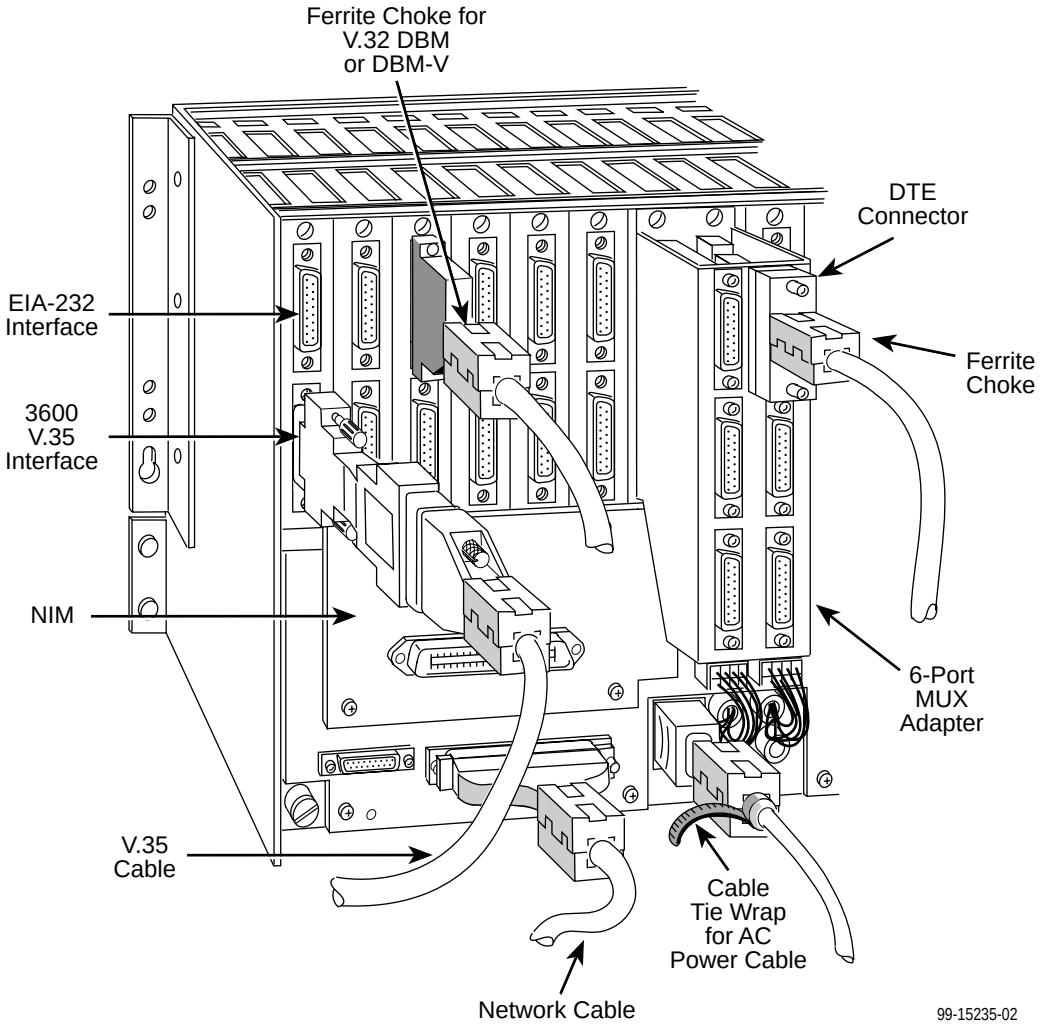


Figure 5-10. Examples of Installed Ferrite Chokes, Carrier Rear View

Pin Assignments A

Overview A-1
Digital/Lease Network Connections A-1
NIM Interface Connections A-2
NMS Interface Connections A-3
50-Pin Modular Plugs A-4
Carrier Backplane Connectors A-7
D-Lead Control Interface A-8

Overview

This appendix provides the interface connections, pin assignments, and other information for the following:

- Digital or leased-line network connection
- NIMs
- SDU
- 50-pin modular plug
- Carrier backplane connectors
- D-Lead control interface

Pin assignments vary from one product to another. For information on a specific cable or connector, see the appropriate installation or user's manual for the product.

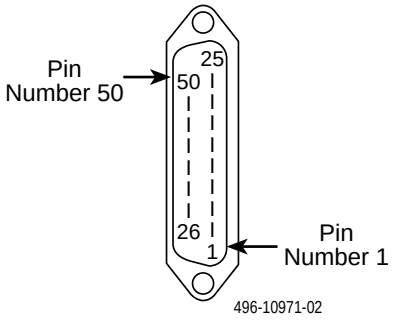


Figure A-1. 50-Pin Cable Connector

Digital/Lease Network Connections

Two 50-pin connectors on the backplane provide an interface between the carrier and the digital/lease network.

- Figure A-1 is a diagram of the 50-pin digital or analog leased-line network interface connector.
- Table A-1 provides the digital or analog leased-line network interface connector pin assignments.

Table A-1
Digital or Analog
Leased-Line Network Interface

Slot	Pin Assignments			
	Receive Circuits		Transmit Circuits	
	T	R	T1	R1
1 or 9	26	1	27	2
2 or 10	28	3	29	4
3 or 11	30	5	31	6
4 or 12	32	7	33	8
5 or 13	34	9	35	10
6 or 14	36	11	37	12
7 or 15	38	13	39	14
8 or 16	40	15	41	16

NIM Interface Connections

One or two optional 50-pin NIMs provide the interface to the dial network or the 2-wire switched 56 kbps digital network.

- Table A-2 provides the permissive dial NIM pin assignments for dial, ISDN, and 2-wire switched 56 kbps applications.
- Table A-3 supplies the programmable dial NIM pin assignments.
- Table A-4 provides the 4-wire switched 56 kbps NIM pin assignments.
- Table A-5 includes the 24-port modem pin assignments.

Table A-2
RJ21X Permissive Dial NIM Used for Dial, ISDN, and 2-Wire Switched 56 kbps NIM

Slot	Pin Assignments	
	T	R
1 or 9	26	1
2 or 10	27	2
3 or 11	28	3
4 or 12	29	4
5 or 13	30	5
6 or 14	31	6
7 or 15	32	7
8 or 16	33	8

Table A-3
RJ27X Programmable Dial NIM

Slot	Pin Assignments			
	T	R	PR	PC
1 or 9	27	2	28	3
2 or 10	30	5	31	6
3 or 11	33	8	34	9
4 or 12	36	11	37	12
5 or 13	39	14	40	15
6 or 14	42	17	43	18
7 or 15	45	20	46	21
8 or 16	48	23	49	24

Table A-4
SJA57 4-Wire Switched 56 kbps NIM

Slot	Receive		Transmit	
	T	R	T1	R1
1 or 9	26	1	27	2
2 or 10	28	3	29	4
3 or 11	30	5	31	6
4 or 12	32	7	33	8
5 or 13	34	9	35	10
6 or 14	36	11	37	12
7 or 15	38	13	39	14
8 or 16	40	15	41	16

Table A-5
24-Port NIM Pin Assignments

Carrier Slot	Modem	Tip	Ring
1 or 9	A	26	1
	B	34	9
	C	42	17
2 or 10	A	27	2
	B	35	10
	C	43	18
3 or 11	A	28	3
	B	36	11
	C	44	19
4 or 12	A	29	4
	B	37	12
	C	45	20
5 or 13	A	30	5
	B	38	13
	C	46	21
6 or 14	A	31	6
	B	39	14
	C	47	22
7 or 15	A	32	7
	B	40	15
	C	48	23
8 or 16	A	33	8
	B	41	16
	C	49	24

NMS Interface Connections

For NMS/SDU connections:

- Table A-6 provides the SDU to NMS pin assignments.
- Table A-7 supplies the SDU to SDCP pin assignments.

Table A-6
SDU to NMS Interface

Pin #	Circuit		Function
	CC IN/ DC OUT	CC OUT/ DC IN	
1	RSI	RSO	Request to Send
2	CSO	CSI	Clear to Send
3	RDO	RDI	Receive Data
4	SG	SG	Signal Ground
5	SDI	SDO	Transmit Data
6	+Vdc	—	+12 Vdc Output

Table A-7
SDU to SDCP Interface

Pin #	Circuit		Function
	FP IN	FP OUT	
1	Ground	Ground	Ground
4	SG	SG	Signal Ground
5	FPRDO	FPRDI	Receive Data
6	FPSDI	FPSDO	Send Data
7	FPAALM	FPAALM	Audible Alarm
8	FPLALMO	FPLALMI	LED Alarm

50-Pin Modular Plugs

The 24-port DTE interface uses a 26-gauge stranded octopus cable with a 50-pin modular plug. The octopus cable contains 24 6-pin modular cables, as shown in Figure A-2.

Figure A-3 shows a 50-pin modular plug conversion cable used for digital and leased-line networks.

Tables A-8 through A-11 list the pin assignments for all 50-pin to modular plug conversion cables.

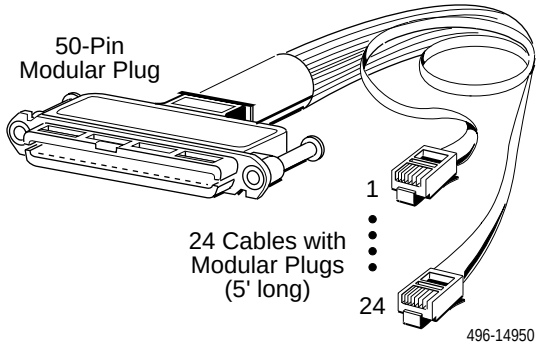


Figure A-2. 50-Pin Cable with 24 6-Pin Modular Plugs

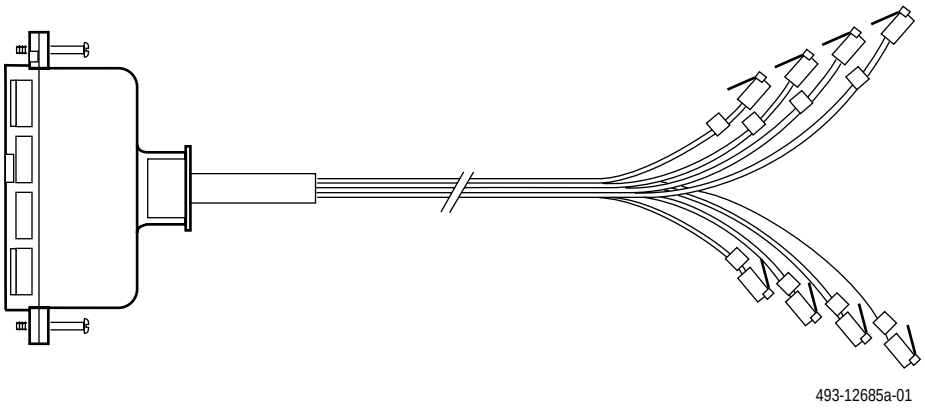


Figure A-3. 50-Pin to Modular Plug Digital/Lease Conversion Cable

Table A-8
Pin Assignments for Digital and JM8 Leased Network Interface Cables, Feature 3600-F2-503

50-Position Pin #	Signal Name	Modular Plug #	Modular Pin #
2	R1 (transmit)	1	1 of 8
27	T1 (transmit)	1	2 of 8
26	T (receive)	1	7 of 8
1	R (receive)	1	8 of 8
4	R1 (transmit)	2	1 of 8
29	T1 (transmit)	2	2 of 8
28	T (receive)	2	7 of 8
3	R (receive)	2	8 of 8
6	R1 (transmit)	3	1 of 8
31	T1 (transmit)	3	2 of 8
30	T (receive)	3	7 of 8
5	R (receive)	3	8 of 8
8	R1 (transmit)	4	1 of 8
33	T1 (transmit)	4	2 of 8
32	T (receive)	4	7 of 8
7	R (receive)	4	8 of 8
10	R1 (transmit)	5	1 of 8
35	T1 (transmit)	5	2 of 8
34	T (receive)	5	7 of 8
9	R (receive)	5	8 of 8
12	R1 (transmit)	6	1 of 8
37	T1 (transmit)	6	2 of 8
36	T (receive)	6	7 of 8
11	R (receive)	6	8 of 8
14	R1 (transmit)	7	1 of 8
39	T1 (transmit)	7	2 of 8
38	T (receive)	7	7 of 8
13	R (receive)	7	8 of 8
16	R1 (transmit)	8	1 of 8
41	T1 (transmit)	8	2 of 8
40	T (receive)	8	7 of 8
15	R (receive)	8	8 of 8

Table A-9
Pin Assignments for Analog V.32 DBM Programmable – RJ45S Network Interface Cable, Feature 3600-F2-504

50-Position Pin #	Signal Name	Modular Plug #	Modular Pin #
2	Ring	1	4 of 8
27	Tip	1	5 of 8
28	PR	1	7 of 8
3	PC	1	8 of 8
5	Ring	2	4 of 8
30	Tip	2	5 of 8
31	PR	2	7 of 8
6	PC	2	8 of 8
8	Ring	3	4 of 8
33	Tip	3	5 of 8
34	PR	3	7 of 8
9	PC	3	8 of 8
11	Ring	4	4 of 8
36	Tip	4	5 of 8
37	PR	4	7 of 8
12	PC	4	8 of 8
14	Ring	5	4 of 8
39	Tip	5	5 of 8
40	PR	5	7 of 8
15	PC	5	8 of 8
17	Ring	6	4 of 8
42	Tip	6	5 of 8
43	PR	6	7 of 8
18	PC	6	8 of 8
20	Ring	7	4 of 8
45	Tip	7	5 of 8
46	PR	7	7 of 8
21	PC	7	8 of 8
23	Ring	8	4 of 8
48	Tip	8	5 of 8
49	PR	8	7 of 8
24	PC	8	8 of 8

Table A-10
Pin Assignments for Dial Permissive – RJ11C Network Interface Cable, Feature 3600-F2-505

50-Position Pin #	Signal Name	Modular Plug #	Modular Pin #
1	Ring	1	3 of 6
26	Tip	1	4 of 6
2	Ring	2	3 of 6
27	Tip	2	4 of 6
3	Ring	3	3 of 6
28	Tip	3	4 of 6
4	Ring	4	3 of 6
29	Tip	4	4 of 6
5	Ring	5	3 of 6
30	Tip	5	4 of 6
6	Ring	6	3 of 6
31	Tip	6	4 of 6
7	Ring	7	3 of 6
32	Tip	7	4 of 6
8	Ring	8	3 of 6
33	Tip	8	4 of 6

Table A-11
Pin Assignments for 50-Pin to Eight 6-Pin Modular Network Interface Cable, Feature 3000-F1-009

50-Position Pin #	Signal Name	Modular Plug #	Modular Pin #
2	Transmit	1	3 of 6
27	Transmit	1	4 of 6
26	Receive	1	2 of 6
1	Receive	1	5 of 6
4	Transmit	2	3 of 6
29	Transmit	2	4 of 6
28	Receive	2	2 of 6
3	Receive	2	5 of 6
6	Transmit	3	3 of 6
31	Transmit	3	4 of 6
30	Receive	3	2 of 6
5	Receive	3	5 of 6
8	Transmit	4	3 of 6
33	Transmit	4	4 of 6
32	Receive	4	2 of 6
7	Receive	4	5 of 6
10	Transmit	5	3 of 6
35	Transmit	5	4 of 6
34	Receive	5	2 of 6
9	Receive	5	5 of 6
12	Transmit	6	3 of 6
37	Transmit	6	4 of 6
36	Receive	6	2 of 6
11	Receive	6	5 of 6
14	Transmit	7	3 of 6
39	Transmit	7	4 of 6
38	Receive	7	2 of 6
13	Receive	7	5 of 6
16	Transmit	8	3 of 6
41	Transmit	8	4 of 6
40	Receive	8	2 of 6
15	Receive	8	5 of 6

Carrier Backplane Connectors

The center connectors are P19 and P20. These connectors supply low ac or dc voltage from the power supply unit to the COMSPHERE 3000 Series Carrier's backplane.

Table A-12 provides descriptions of the connectors on the right and left side of the carrier's backplane.

Figure A-4 illustrates the connectors on the COMSPHERE 3000 Series Carrier backplane.

Table A-12
Connectors on the COMSPHERE 3000 Series Carrier Backplane

Connectors for Slots 1–8	Connectors for Slots 9–16	Function
P21	P22	This 50-pin connector provides the digital or 4-wire and 2-wire leased-line interface for DCEs (DSUs and dial/lease modems).
P23 & P24	P25 & P26	These connectors are used by the Network Interface Modules (NIMs) to provide the dial interface through a 50-pin connector for dial/lease modems.
J1	J2	This 26-pin high-density D-type connector provides the D-lead control interface for dial/lease modems. (Refer to Table A-13 for pin assignments).

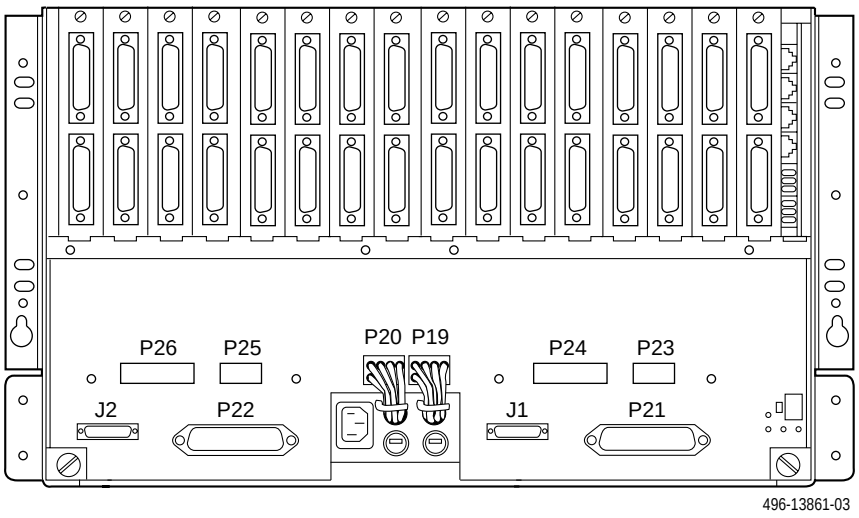


Figure A-4. Connectors on the COMSPHERE 3000 Series Carrier Backplane

D-Lead Control Interface

The COMSPHERE dial/lease D-lead control interface is used in modem-pooling applications to cause the modem to go off-hook in the Originate mode. This interface is provided on connector J1 for Slots 1–8 and connector J2 for Slots 9–16.

Table A-13 provides the D-lead control interface pin assignments.

Table A-13
D-Lead Control Interface

Slot	Connector	Pin #	Signal Name*
1	J1	16 15	DLCTL NC
2	J1	14 1	DLCTL NC
3	J1	2 3	DLCTL NC
4	J1	4 5	DLCTL NC
5	J1	6 7	DLCTL NC
6	J1	8 9	DLCTL NC
7	J1	10 11	DLCTL NC
8	J1	12 13	DLCTL NC
—	J2	25	SIG GND
9	J2	16 15	DLCTL NC
10	J2	14 1	DLCTL NC
11	J2	2 3	DLCTL NC
12	J2	4 5	DLCTL NC
13	J2	6 7	DLCTL NC
14	J2	8 9	DLCTL NC
15	J2	10 11	DLCTL NC
16	J2	12 13	DLCTL NC
—	J2	25	SIG GND

* DLCTL = D-Lead Control NC = No Connection
SIG GND = Signal Ground

T1 CSU and T1 DSU/CSU Interface Connectors B

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Diagnostic Channel Extension Cable B-10
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Overview

The ACCULINK T1 CSUs and T1 DSU/CSUs are shipped without cables.

- Various interconnecting cables, available from Paradyne, have a feature number assigned to them (see Appendix D, *Equipment List*).
- This appendix describes the cable pin assignments for both Paradyne cables and customer-supplied cables. Use this information if you need to build your own cables.

Unless otherwise noted, the interface connections apply to both T1 CSUs and T1 DSU/CSUs.

T1 Auxiliary Backplane Connectors

The T1 auxiliary backplane provides the connectors described in Table B-1 and shown in Figure B-1.

Table B-1
T1 Interface Connectors

Connector	Quantity	T1 Type	Use
DTE	8	CSU and DSU/CSU	DB15 socket. Provides the connection to your T1 DSX-1 (DTE).
Network Interface	1	CSU and DSU/CSU	50-pin RJ48H plug. Provides the connection to the T1 network for all eight slots supported by the T1 auxiliary backplane.
Clock In	1	DSU/CSU	DB9 socket. Attaches an external clock that provides timing for up to eight slots. Each T1 auxiliary backplane must have its own external clock input.
Port 1 & 2	16	CSU and DSU/CSU	DB25 (EIA-530-A) socket. Provides the connection from a T1 DSU/CSU to the synchronous data DTE. The Port 2 DB25 socket connector allows one slot in the carrier to be configured as the COM port, which replaces the functionality of the second data port. The COM port is a communications port providing access to the front panel from a locally connected PC.
Diagnostic Chan	2	CSU and DSU/CSU	8-pin modular jack. Provides diagnostic connectivity between T1 auxiliary backplanes in a carrier.

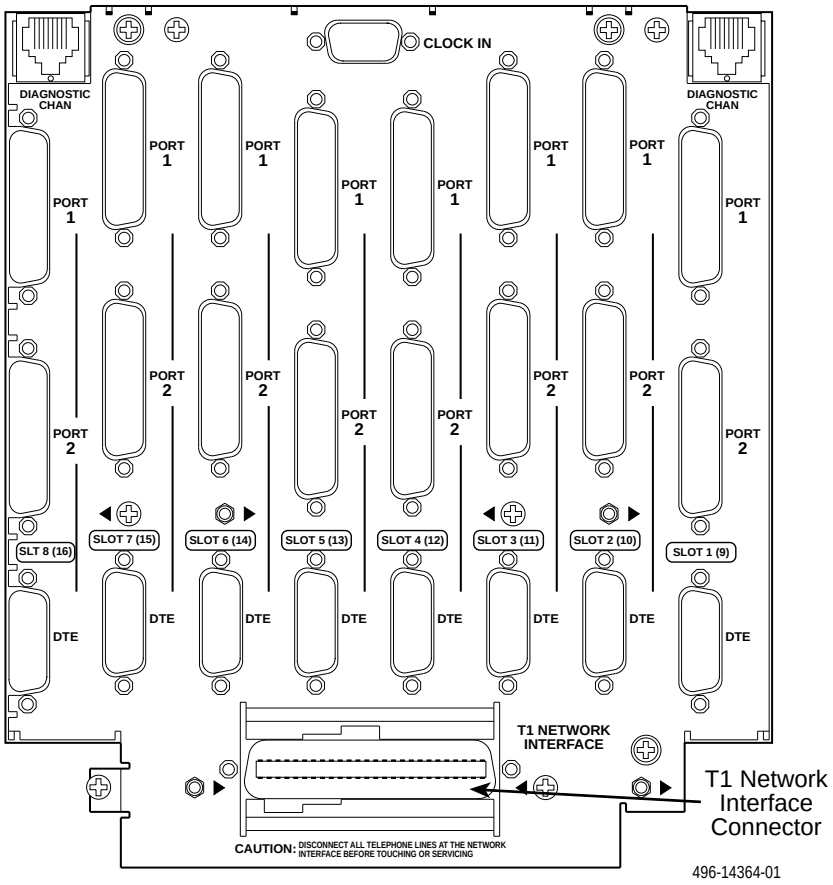

Figure B-1. T1 Auxiliary Backplane Connectors

T1 Network Interface Connector

The T1 line network interface breakout cable has the following characteristics:

- 2 1/2-foot octopus cable with a 50-pin Telco-type socket (RJ48H) on one end (see Figure B-2)
- Eight unkeyed 8-pin modular plugs (RJ48C) on the other end
- Paired, 24 AWG solid conductors

Table B-2 shows the pin assignments for the 50-pin Telco plug RJ48H connector.

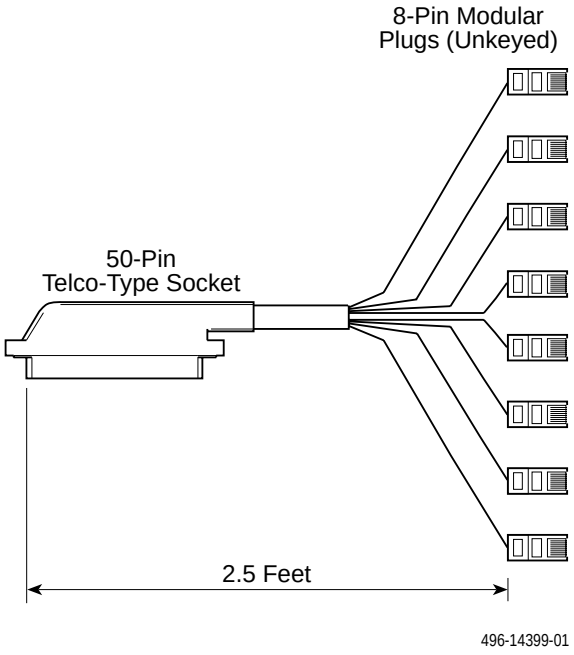

Figure B-2. T1 Network Interface Connector

Table B-2
T1 Network Interface Connector (RJ48H)

Signal	Slot	Pin #
Transmit Ring	1 or 9	14
Transmit Tip	1 or 9	39
Receive Ring	1 or 9	1
Receive Tip	1 or 9	26
Transmit Ring	2 or 10	15
Transmit Tip	2 or 10	40
Receive Ring	2 or 10	2
Receive Tip	2 or 10	27
Transmit Ring	3 or 11	16
Transmit Tip	3 or 11	41
Receive Ring	3 or 11	3
Receive Tip	3 or 11	28
Transmit Ring	4 or 12	17
Transmit Tip	4 or 12	42
Receive Ring	4 or 12	4
Receive Tip	4 or 12	29
Transmit Ring	5 or 13	18
Transmit Tip	5 or 13	43
Receive Ring	5 or 13	5
Receive Tip	5 or 13	30
Transmit Ring	6 or 14	19
Transmit Tip	6 or 14	44
Receive Ring	6 or 14	6
Receive Tip	6 or 14	31
Transmit Ring	7 or 15	20
Transmit Tip	7 or 15	45
Receive Ring	7 or 15	7
Receive Tip	7 or 15	32
Transmit Ring	8 or 16	21
Transmit Tip	8 or 16	46
Receive Ring	8 or 16	8
Receive Tip	8 or 16	33

DSX-1 Port DTE Interface

The DSX-1 cable is typically supplied by a DTE vendor (see Figure B-3) and is a:

- 22 AWG solid, individually shielded twisted pair cable with drain wire.
- DB15 plug. Be sure to connect the shield ground only at the T1 DSU/CSU end as shown to prevent ground loops.

The DTE (DSX-1) interface connector is a DB15-type socket connector (see Table B-3). Refer to the *ACCULINK 315x Channel Service Unit Operator's Guide* or the *ACCULINK 3160, 3161, 3164, and 3165 DSU/CSU Operator's Guide* for more information.

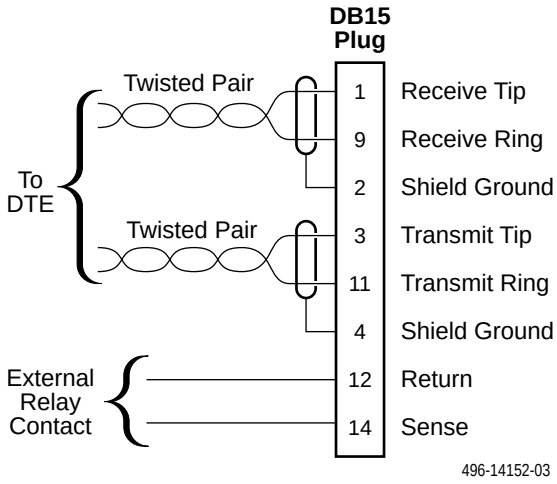

Figure B-3. DTE (DSX-1) Cable

Table B-3
DTE (DSX-1) Interface Connector (J3)

Signal	Pin #
Receiver Tip from DTE	1
Receiver Ring from DTE	9
Transmitter Tip to DTE	3
Transmitter Ring to DTE	11
Relay Contact Sense Return	12
Relay Contact Sense	14
Shield Ground	2, 4

Connecting to the DTE

To connect the DTE to the modem, you can use two DB25 to 8-position modular adapters and an 8-pin RJ45-type modular cable instead of an RS-232 cable with DB25 connectors. Because of the large number of cables required for typical 24-port installations, the slimmer modular cable is recommended.

The connectors on the DTE interface assembly are labeled, from top to bottom: **A**, **B**, and **C**. These markings show which modem on a card is associated with each connector.

- Connect the DB25 adapter or the connector on an RS-232 DTE cable to one of the DB25 connectors on the DTE interface assembly. Use a small screwdriver to fasten the connector to the backplate.
- Connect the DB25 adapter or connector on the cable to the DB25 connector on the DTE. Use a small screwdriver to fasten the cable to the DTE.

COM Port Interface

The COM port connects to either a personal computer (PC) or an async terminal and printer:

The PC connection uses the:

- COM port-to-PC cable. This cable is a 14-foot, 26 AWG, 8-conductor cable with an 8-position modular plug keyed connector and a DB9 socket connector (see Figure B-4).
- COM port connector with a plastic body adapter for converting a DB25 interface to an 8-pin modular jack (see Figures B-5 and B-6). This connector is used in conjunction with the COM port adapter cable.

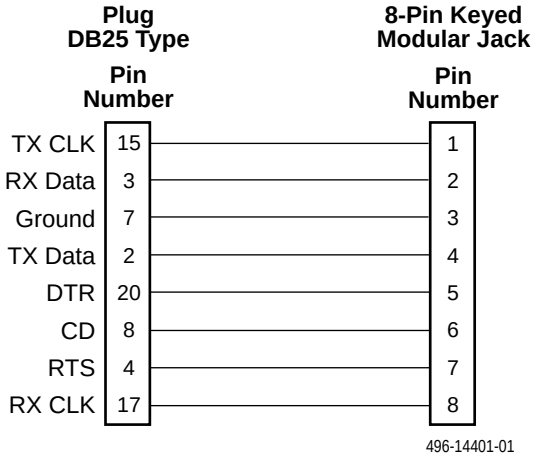

Figure B-5. COM Port-to-PC Adapter

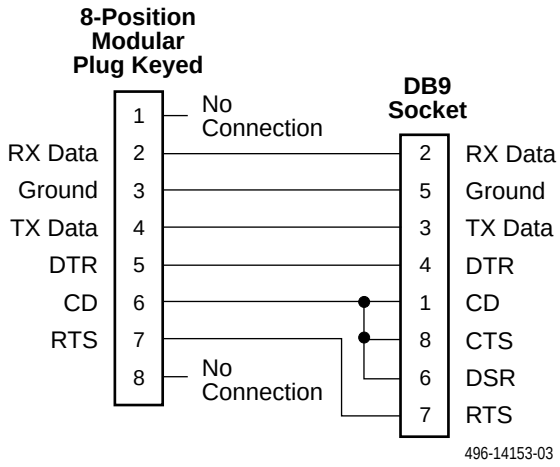

Figure B-4. COM Port-to-PC Cable

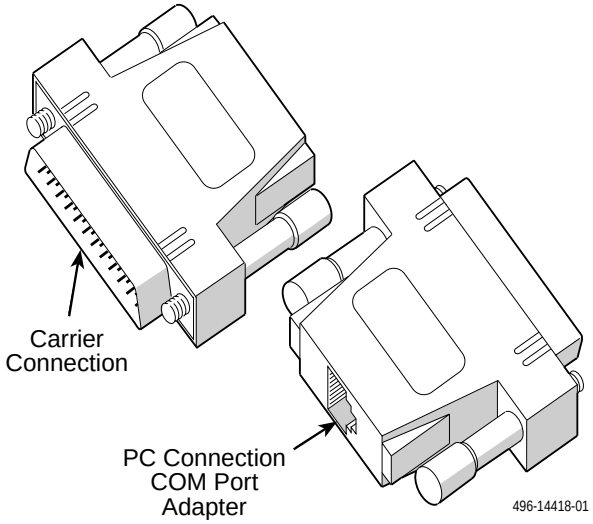

Figure B-6. COM Port Adapter

The async terminal connection uses the:

- COM port-to-terminal/printer cable. This cable is a 14-foot, 26 AWG 8-conductor cable with an 8-position modular plug keyed connector and a DB25 plug connector (see Figure B-7).
- COM port adapter connector with an 8-position keyed modular jack (see Table B-4). The data signals on this port are referenced to a DTE interface.

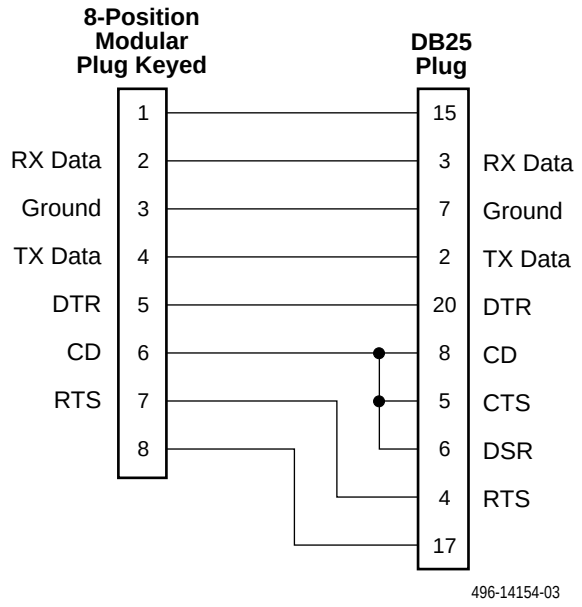

Figure B-7. COM Port-to-Terminal/Printer Cable

Table B-4
COM Port Adapter Connector (J6)

Signal	To/From	Pin #
Reserved for future use	to DTE (Out)	1
DCE Received Data	to DTE (Out)	2
SIGNAL Ground	—	3
DCE Transmit Data	from DTE (IN)	4
DCE Data Terminal Ready	from DTE (IN)	5
DCE Carrier Detect	to DTE (Out)	6
DCE Request to Send	from DTE (IN)	7
Reserved for future use	to DTE (Out)	8

Port Interfaces

The port interface connectors (T1 DSU/CSU only) include the EIA-530-A DB25 connector. The V.35 connector and the RS-449 connector require an adapter cable.

EIA-530-A DB25 Port Interface Connector

The EIA-530-A Port Interface connector information is shown in Table B-5.

Table B-5
EIA-530-A Port Interface Connector

Signal	Circuit Label	ITU #	To/ From	Pin #
Signal Common	AB	102A	—	7
Signal Common	AC	102B	—	22, 23
Transmitted Data	BA	103	To DCE	2 (A) 14 (B)
Received Data	BB	104	From DCE	3 (A) 16 (B)
Request to Send	CA	105	To DCE	4 (A)
Clear to Send	CB	106	From DCE	5 (A) 13 (B)
Received Line Signal Detector	CF	109	From DCE	8 (A) 10 (B)
DCE Ready	CC	107	From DCE	6
DTE Ready	CD	108/1, /2	To DCE	20
Transmit Signal Element Timing – DTE Source	DA	113	To DCE	11 (A) 24 (B)
Transmit Signal Element Timing – DCE Source	DB	114	From DCE	12 (A) 15 (B)
Receiver Signal Element Timing – DCE Source	DD	115	From DCE	17 (A) 9 (B)
Local Loopback	LL	141	To DCE	18
Remote Loopback	RL	140	To DCE	21
Test Mode	TM	142	From DCE	25

RS-449 Port Interface Connector

The RS-449 Port Interface connector and adapter cable information is shown in Figure B-8 and Table B-6.

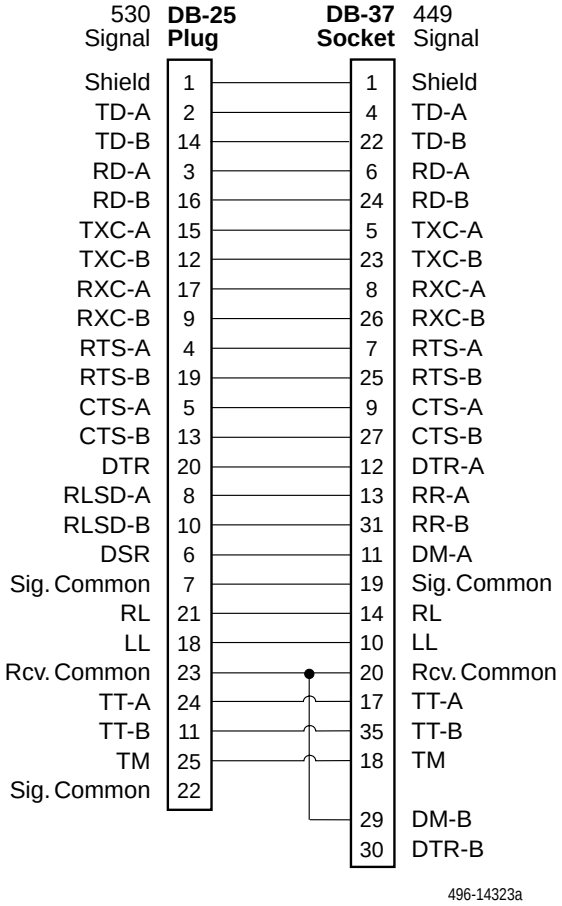

Figure B-8. EIA-530-A to RS-449 Adapter Cable

Table B-6
RS-449 Port Interface Connector

Signal	Circuit Label	ITU #	To/ From	Pin #
Shield	—	—	—	1
Signal Ground	SG	102A	—	19
Receive Ground	RC	102B	—	20
Send Common	SC	—	—	37
Send Data	SD	103	To DCE	4 (A) 22 (B)
Receive Data	RD	104	From DCE	6 (A) 24 (B)
Request to Send	RS	105	To DCE	7 (A) 25 (B)
Clear to Send	CS	106	From DCE	9 (A) 27 (B)
Receiver Ready	RR	109	From DCE	13 (A) 31 (B)
Data Mode	DM	107	From DCE	11 (A) 29 (B)
Terminal Ready	TR	108/1, /2	To DCE	12 (A) 30 (B)
Terminal Timing	TT	113	To DCE	17 (A) 35 (B)
Send Timing	ST	114	From DCE	5 (A) 23 (B)
Receive Timing	RT	115	From DCE	8 (A) 26 (B)
Local Loopback	LL	141	To DCE	10
Remote Loopback	RL	140	To DCE	14
Test Mode	TM	142	From DCE	18

V.35 Port Interface Connector

The V.35 Port Interface connector and adapter information is shown in Figure B-9 and Table B-7.

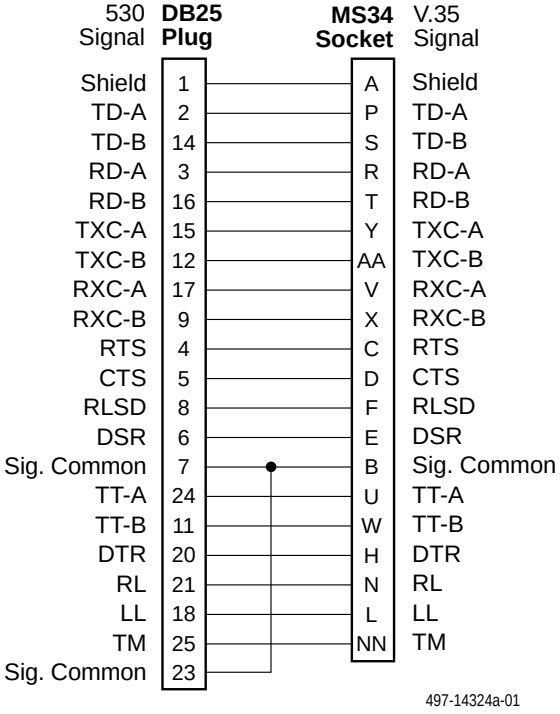

Figure B-9. EIA-530-A to V.35 Adapter

Table B-7
V.35 Port Interface Connectors

Signal	ITU #	To/ From	Pin #
Shield	—	—	A
Signal Common	102	—	B
Transmitted Data	103	To DCE	P (A) & S (B)
Received Data	104	From DCE	R (A) & T (B)
Request to Send	105	To DCE	C
Clear to Send	106	From DCE	D
Data Channel Received Line Signal Detector	109	From DCE	F
Data Set Ready	107	From DCE	E
Data Terminal Ready	108/1, /2	To DCE	H
Transmit Signal Element Timing (DTE Source)	113	To DCE	U (A) & W (B)
Transmit Signal Element Timing (DCE Source)	114	From DCE	Y (A) & AA (B)
Receiver Signal Element Timing (DCE Source)	115	From DCE	V (A) & X (B)
Local Loopback	141	To DCE	L
Loopback/Maintenance	140	To DCE	N
Test Indicator	142	From DCE	NN

Standard EIA-232-D Crossover Cable

A standard EIA-232-D crossover cable can be used to connect to an external modem. Refer to Figure B-10.

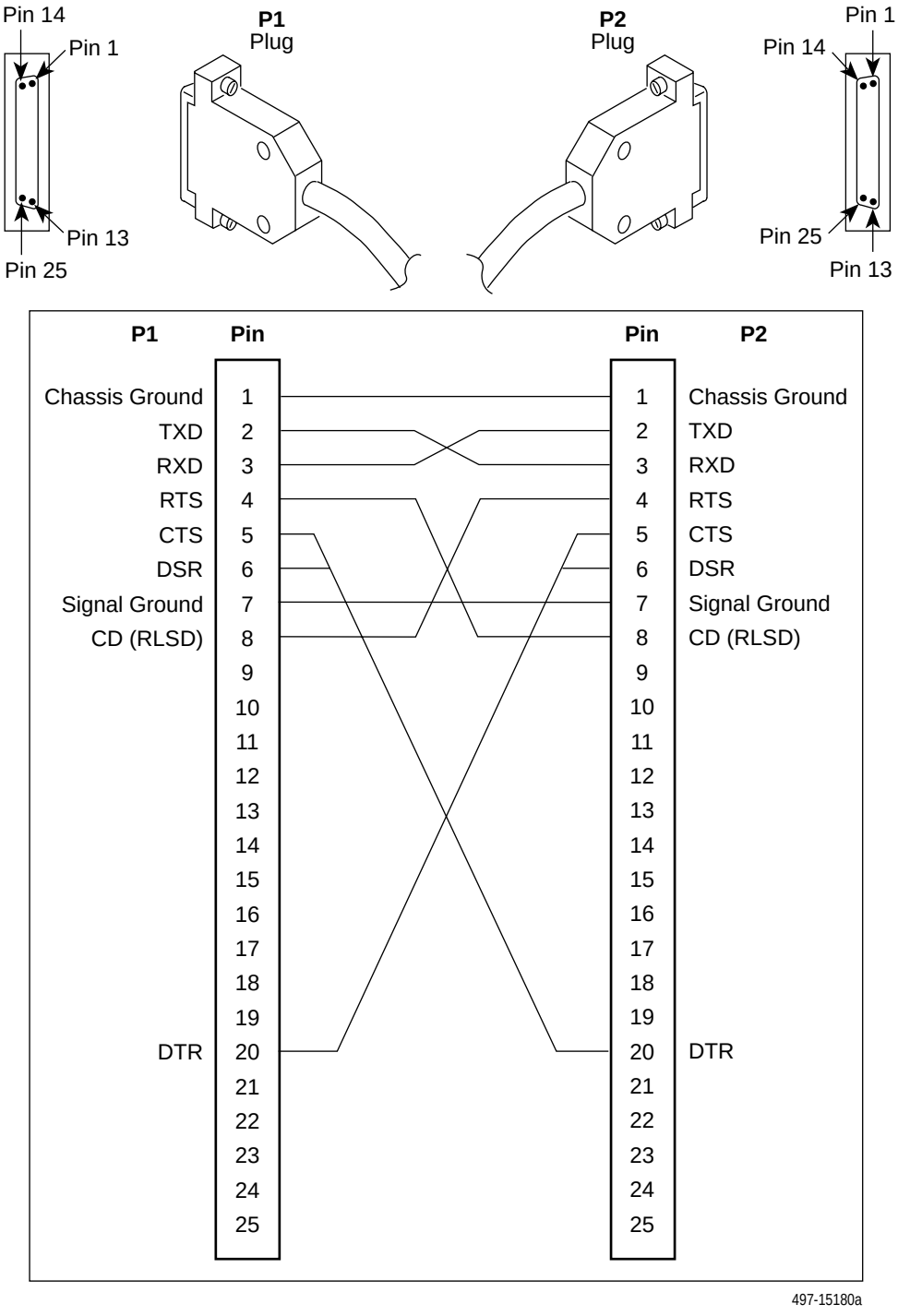

Figure B-10. Standard EIA-232-D Crossover Cable

Diagnostic Channel Extension Cable

To connect two T1 auxiliary backplanes, a 12-inch cable with 8-pin modular plugs at each end is used (see Figures B-11 and B-12).

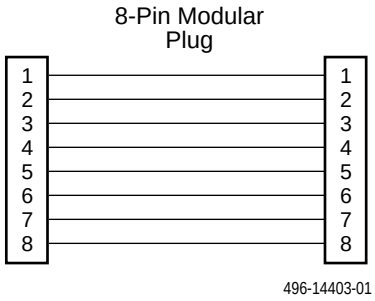

Figure B-11. Diagnostic Channel Extension Cable Connectors

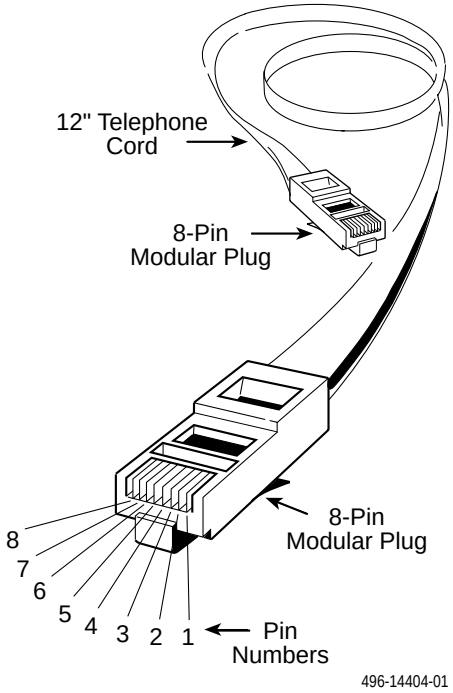

Figure B-12. Diagnostic Channel Extension Cable

External Clock Connector

The External Clock connector cable (T1 DSU/CSU only) diagram is shown in Figure B-13. This is a customer-supplied cable. Connector pinouts are in Table B-8.

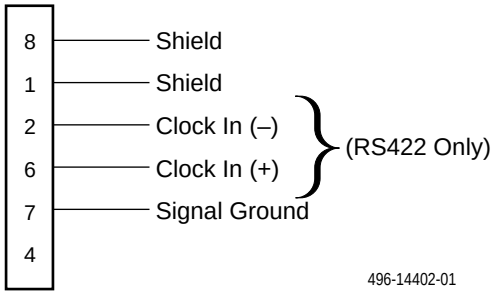

Figure B-13. External Clock Connector

Table B-8
External Clock Connector

Signal	Pin #
Shield	1, 8
Clock (+) RS422 only	6
Clock (–) RS422 only	2
Signal Common	7

Technical Specifications C

Table C-1
(1 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
ENVIRONMENT	
Operating Temperature	32°F (0°C) to 122°F (50°C)
Storage Temperature	–4°F (–20°C) to 158°F (70°C)
Relative Humidity	5% to 95% (noncondensing)
Shock and Vibration	Withstands normal shipping and handling
POWER REQUIREMENTS	
Carrier with ac power supply (maximum capacity)	
100 Vac (approved for use with Models 3811, 3821, 3911, 3921, 3981)	85–100 Vac, 47-63 Hz (3.0 amp, 175 watts at 100 Vac)
115 Vac (approved for use with Models 3151, 3161, 3511, 3551, 3611, 3616, 3811, 3821, 3911, 3921, 3981)	90–132 Vac, 60 Hz ±3 (3.0 amp, 216 watts at 115 Vac)
230 Vac (approved for use with Models 3811, 3821, 3911, 3921, 3981)	220–240 Vac nominal, 47 to 63 Hz (1.5 amp, 175 watts at 230 Vac)
Fan Module	
100 Vac	Supplied by carrier, 45 watts at 100 Vac
115 Vac	Supplied by carrier, 45 watts at 115 Vac
230 Vac	Supplied by carrier, 57 watts at 230 Vac
Shared Diagnostic Control Panel (SDCP)	
100 Vac	Supplied by carrier, 1 watt at 100 Vac
115 Vac	Supplied by carrier, 1 watt at 115 Vac
230 Vac	Supplied by carrier, 1 watt at 230 Vac

Table C-1
(2 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
POWER REQUIREMENTS (Continued)	
Shared Diagnostic Unit (SDU)	24 Vac (CT), 60 Hz ±3 (0.01 amp, 1.5 watts at 115 Vac)
Model 3151	24 Vac (CT), 60 Hz ±3 (3.7 watts at 115 Vac)
Model 3161	24 Vac (CT), 60 Hz ±3 (9.3 watts at 115 Vac)
Model 3511	24 Vac (CT), 60 Hz ±3 (0.07 amp, 6 watts at 115 Vac)
Models 3551 and 3611	24 Vac (CT), 60 Hz ±3 (0.03 amp, 4.5 watts at 115 Vac)
DBM-D, DBM-I, DBM-S or DBM-V	24 Vac (CT), 60 Hz ±3 (0.05 amp, 8.0 watts at 115 Vac)
Models 3551, 3611, and 3616 with DBM	24 Vac (CT), 60 Hz ±3 (0.05 amp, 8.0 watts at 115 Vac)
Model 3611 with TDM	24 Vac (CT), 60 Hz ±3 (0.07 amp, 8.6 watts at 115 Vac)
Model 3611 with DBM and TDM	24 Vac (CT), 60 Hz ±3 (0.09 amp, 12.15 watts at 115 Vac)
Model 3611 with MCMP	24 Vac (CT), 60 Hz ±3 (0.08 amp, 9.1 watts at 115 Vac)
Model 3611 with DBM and MCMP	24 Vac (CT), 60 Hz ±3 (0.10 amp, 12.65 watts at 115 Vac)
Model 3811 modem	24 Vac (CT), 47–63 Hz (0.05 amp, 3.4 watts at 100 Vac) 24 Vac (CT), 60 Hz ±3 (0.04 amp, 3.4 watts at 115 Vac) 24 Vac (CT), 47–63 Hz (0.02 amp, 3.4 watts at 230 Vac)
Model 3821 modem	24 Vac (CT), 47–63 Hz (0.08 amp, 7.5 watts at 100 Vac) 24 Vac (CT), 60 Hz ±3 (0.07 amp, 7.5 watts at 115 Vac) 24 Vac (CT), 47–63 Hz (0.03 amp, 7.5 watts at 230 Vac)
Model 3911, 3921 1-port, and 3981 modems	24 Vac (CT), 47–63 Hz (0.07 amp, 4.0 watts at 100 Vac) 24 Vac (CT), 60 Hz ±3 (0.06 amp, 4.0 watts at 115 Vac) 24 Vac (CT), 47–63 Hz (0.03 amp, 4.0 watts at 230 Vac)
Model 3921 4-port modem	24 Vac (CT), 47–63 Hz (0.06 amp, 6.0 watts at 100 Vac) 24 Vac (CT), 60 Hz ±3 (0.05 amp, 6.0 watts at 115 Vac) 24 Vac (CT), 47–63 Hz (0.03 amp, 6.0 watts at 230 Vac)
Carrier with sixteen 3551, 3611, and 3616 DSUs with DBMs plus SDU and fan module	90–132 Vac, 60 Hz ±3 (1.65 amp, 165 watts at 115 Vac)
Carrier with sixteen 3151 T1 CSUs plus SDU, SDCP, and fan module	90–132 Vac, 60 Hz ±3 (1.25 amp, 111 watts at 115 Vac)
Carrier with sixteen 3161 T1 DSU/CSUs plus SDU, SDCP, and fan module	90–132 Vac, 60 Hz ±3 (2.4 amp, 215 watts at 115 Vac)
ALARM CIRCUIT CAPACITY	42 Vac, 60 Vdc Max. at 1.0 amp Max.
FAN MODULE POWER DISSIPATION	
100 Vac	154 Btu/hr.
115 Vac	154 Btu/hr.
230 Vac	195 Btu/hr.

Table C-1
(3 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
HEAT DISSIPATION (MAXIMUM)	
Shared Diagnostic Unit (SDU)	5.2 Btu/hr.
Model 3151 T1 CSU	12.6 Btu/hr.
Model 3161 T1 DSU/CSU	31.7 Btu/hr.
Model 3511 DSU	20.5 Btu/hr.
Models 3551 and 3611 DSUs	22.2 Btu/hr.
DBM-D, DBM-I, DBM-S or DBM-V	29.0 Btu/hr.
Models 3551, 3611, and 3616 with DBM	29.0 Btu/hr.
Model 3611 with TDM	33.4 Btu/hr.
Model 3611 with MCMP	33.4 Btu/hr.
Model 3811 modem	11.7 Btu/hr.
Model 3821 modem	25.6 Btu/hr.
Model 3911, 3921 (1-port), and 3981 modem	13.7 Btu/hr.
Model 3921 (4-port) modem	20.5 Btu/hr.
PHYSICAL DIMENSIONS	
Carrier	
Height	10.5 inches (26.7 cm)
Width	19.0 inches (48.3 cm)
Depth	14.0 inches (35.6 cm)
Power Transformer Unit	
Height	2.5 inches (6.4 cm)
Width	16.9 inches (42.9 cm)
Depth	6.5 inches (16.5 cm)
Fan Module	
Height	1.8 inches (4.4 cm)
Width	19.0 inches (48.3 cm)
Depth	5.0 inches (12.7 cm)
Shared Diagnostic Control Panel (SDCP) or Speaker Panel	
Height	2.6 inches (6.5 cm)
Width (length)	19.0 inches (48.3 cm)
Depth	0.8 inches (1.1 cm)
Shared Diagnostic Unit (SDU)	
Height	7.1 inches (18.1 cm)
Width	1.0 inches (2.5 cm)
Depth	12.9 inches (32.8 cm)

Table C-1
(4 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
PHYSICAL DIMENSIONS (Continued)	
Models 3511, 3551, 3611, 3616, 3811, 3911, 3921 1-port, 3981	
Height	7.1 inches (18.1 cm)
Width (thickness)	1.0 inches (2.5 cm)
Depth	13.4 inches (34.0 cm)
Model 3821	
Height	7.37 inches (18.7 cm)
Width (thickness)	1.0 inches (2.5 cm)
Depth	14.37 inches (36.5 cm)
Model 3611 with TDM or MCMP and Model 3921 4-port	
Height	7.1 inches (18.1 cm)
Width (widest-point faceplates)	2.0 inches (5.0 cm)
Depth	13.4 inches (34.0 cm)
Models 3151 and 3161	
Height	7.1 inches (18.0 cm)
Width	1.0 inches (2.5 cm)
Depth	14.2 inches (36.1 cm)
Rear Connector Plate (2-port)	
Height	5.2 inches (13.2 cm)
Width	0.9 inches (2.3 cm)
Depth (25-pin V.35 Interface)	1.0 inches (2.5 cm)
Connector Module (6-port)	
Height	6.9 inches (17.5 cm)
Width	1.8 inches (4.6 cm)
Depth	3.3 inches (8.4 cm)
T1 Auxiliary Backplane	
Height	9.0 inches (22.9 cm)
Width	8.0 inches (20.3 cm)
Depth	1.3 inches (3.3 cm)
WEIGHT	
Carrier (empty)	17.0 pounds (7.7 kg)
Power Transformer Unit	
100 Vac	14.6 pounds (6.6 kg)
115 Vac	19.0 pounds (8.6 kg)
230 Vac	14.1 pounds (6.4 kg)
Fan Module	
100 Vac	6.7 pounds (3.0 kg)
115 Vac	8.0 pounds (3.6 kg)
230 Vac	7.5 pounds (3.4 kg)

Table C-1
(5 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
WEIGHT (Continued)	
Shared Diagnostic Control Panel (SDCP)	1.6 pounds (0.7 kg)
Rear Connector Plate (2-port)	
25-pin EIA-232/25-pin V.35	0.1 pound (0.06 kg)
6-port MUX Connector Module	1.0 pound (0.5 kg)
2-slot Triple Modem Connector Module	0.7 pound (0.3 kg)
24-port DTE Interface Assembly	2.1 pounds (1.1 kg)
Speaker Panel	1.3 pounds (0.6 kg)
Shared Diagnostic Unit (SDU)	1.0 pound (0.5 kg)
Network Interface Module (NIM)	0.2 pound (0.1 kg)
Model 3151	1.3 pounds (0.6 kg)
Model 3161	1.8 pounds (0.82 kg)
Model 3821	1.4 pounds (0.6 kg)
Model 3921, 3981	1.0 pound (0.5 kg)
T1 Auxiliary Backplane	2.4 pounds (1.1 kg)
NETWORK INTERFACE	Full Compliance with AT&T Technical Reference 62310-1987, ‘‘Digital Data System Channel Interface Specification,” November 1987; and Bell Canada ‘‘Digital Circuit Terminating Equipment (DCTE) Specifications,” July 1989, Issue 1
Digital/Lease Network Interface	50-pin connector (2) Digital: USOC RJ48T Lease: 50-pin to 8-pin cable; JM8
Network Interface Module:	
Dial	50-pin connector (1 or 2) Permissive: USOC RJ21X Programmable: USOC RJ27X
4-wire Switched 56 kbps (U.S. only)	50-pin connector (1 or 2): USOC SJA57
2-wire Switched 56 kbps	50-pin connector (1 or 2)
Model 3151 and 3161 Physical Interface	
USA	50-pin connector (1 or 2): RJ48H (T1)
Canada	CA81A (T1 with adapter cable)

Table C-1
(6 of 6)
Technical Specifications for the COMSPHERE 3000 Series Carrier

Technical Specifications	Criteria
DTE INTERFACE	
Model 3151	
Physical Interface	DB15S
Framing Format	D4, ESF
Coding Format	AMI, B8ZS
DTE Line Equalization	5 selectable ranges from 0 to 655 feet (0 to 196.5 meters)
Send AIS	Selectable
Model 3161 (DSX-1)	
Physical Interface	DB15S
Framing Format	D4, ESF
Coding Format	AMI, B8ZS
DTE Line Equalization	5 selectable ranges from 0 to 655 feet (0 to 196.5 meters)
Send AIS	Selectable
MODEL 3161 PORT INTERFACE	
Standards	EIA 530-A, V.35, RS-449, V.11
Rates	Nx64 – 64-1.536 Mb Nx56 – 56-1.344 Mb
MODEL 3161 CLOCKING SOURCES	T1 network interface, DSX-1 T1 interface, Port 1, internal clock, external clock
APPROVALS	Refer to the label on your device or contact your local service representative.

Equipment List D

Document Ordering Information D-1
Equipment List D-3

Document Ordering Information

Table D-1 provides document ordering information.

Contact your sales or service representative to order additional product documentation.

Paradyne documents are also available on the World Wide Web at **www.paradyne.com**. Select *Library* → *Technical Manuals.*

Table D-1
(1 of 2)
Document Ordering Information

Document Name	Feature Number	Comcode	Part Number
COMSPHERE 3000 Series Carrier Installation Manual	3000-M3-001	—	3000-A2-GA31
COMSPHERE –48 Vdc Central Office Power Unit Installation Guide	—	—	3000-A2-GB41
ACCULINK 3151 CSU and 3161 DSU/CSU General Information Guide	—	—	3100-A2-GK40
ACCULINK 3100 Series Harmonica Block Adapter, Feature Number 3100-F1-940, Installation Instructions	—	—	3100-A2-GZ40
ACCULINK 3150 and 3151 CSU Operator's Guide	—	—	3150-A2-GB21
ACCULINK 3160, 3161, 3164, and 3165 DSU/CSU Operator's Guide	—	—	3160-A2-GB21
COMSPHERE 3550 Series Data Service Units, Models 3550 and 3551, User's Guide	—	—	3550-A2-GB20
COMSPHERE 3600 Series Data Service Units, Models 3610 and 3611, User's Guide	3600-M1-005	107149064	3610-A2-GB46
COMSPHERE 3600 Series Data Service Units, Models 3610 and 3611, Time Division Multiplexer, Multichannel Multipoint, and Digital Bridge Options Supplement	3600-M1-006	107149122	3610-A2-GB48
COMSPHERE 3600 Series Data Service Units, Models 3610 and 3611, Dial Backup Module Options Supplement	3600-M1-007	—	3610-A2-GB49
COMSPHERE DualFlow Data Service Units, Models 3615 and 3616, User's Guide	—	—	3615-A2-GB20

Table D-1
(2 of 2)
Document Ordering Information

Document Name	Feature Number	Comcode	Part Number
COMSPHERE 3800 Series Modems, Models 3810, 3811, and 3820, User's Guide	3800-M1-005	—	3810-A2-GB30
COMSPHERE 3821*Plus* Modem User's Guide	—	—	3821-A2-GB20
COMSPHERE 3900 Series Modems, Models 3910 and 3911, Point-to-Point/Multipoint, Installation and Operation Manual	3900-M1-900	107047342	3910-A2-GN32
COMSPHERE 392*xPlus* Modems, Models 3920*Plus* and 3921*Plus*, Technical Reference Manual	—	—	3920-A2-GH30
COMSPHERE 3800*Plus* Modems User's Guide	—	—	3980-A2-GB30

Equipment List

Table D-2 provides an equipment list for the carrier and assembly components. The part number column is for Paradyne's use.

Table D-2
(1 of 4)
Equipment List

Equipment	Feature Number	Comcode	Part Number
Carrier Assembly with			
–48 Vdc Power Unit (includes fan)	3000-B1-501	106459563	—
100 Vac Power Transformer Unit (Japan)	3000-B1-601	107073488	—
115 Vac Power Transformer Unit	3000-B1-201	106779366	—
230 Vac Power Transformer Unit	3000-B1-301	106789110	—
230 Vac Power Transformer Unit (UK)	3000-B1-304	—	—
Included in Carrier Assembly			
Two Spare Slo-Blo 4 amp Fuses (100 and 115 Vac Power Transformer Unit)	—	—	190-0037-0431
Two Spare Slo-Blo 2 amp Fuses (230 Vac Power Transformer Unit)	—	—	190-0035-0031
Cable Ties (6)	—	—	650-0001-0433
Wire 22 AWG Stranded (.2 feet)	—	—	714-0001-2231
Ordered Separately by Customer			
Spare Power Units			
–48 Vdc Power Module (includes fan)	3000-F1-022	106490766	870-1637-0011
100 Vac Power Transformer Unit (Japan)	—	—	327-0079-0031
115 Vac Power Transformer Unit	3000-F1-200	106238538	327-1588-0111
230 Vac Power Transformer Unit	—	—	327-0088-0031
Fan Module			
100 Vac	3000-F1-801	107123572	022-0031-0331
115 Vac	3000-F1-007	106238496	022-0031-0031
230 Vac	3000-F1-800	107074854	022-0031-0431
Spare –48 Vdc Power Module Air Filter	3000-F1-020	106656549	—
Shared Diagnostic Control Panel (SDCP) with Ribbon Cable	3000-F1-001	106303274	870-1574-8201
Spare Ribbon Cable for SDCP	3000-F1-024	—	035-0280-0031
Models 3811, 3911, and 3921 Speaker Panel	3800-F1-011	106597867	869-2250-0011
Shared Diagnostic Unit (SDU)	3000-F1-002	106304181	870-1575-8102
Rear Connector Plate, 25-Pin EIA-232/25-Pin V.35	3000-F1-021	106476229	869-2211-0011

Table D-2
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Equipment List

Equipment	Feature Number	Comcode	Part Number
Filler Panel	3000-F1-008	106238504	—
Modular DSU V.35 Adapter Cable, 25-Pin to 34-Pin (Plug EIA-232/Socket V.35)	3000-F1-510	106476237	035-0135-0031
6-Port V.35 Interconnect Cable,1′ (26-pin/V.35)	3600-F3-500	106953508	035-0174-0031
Carrier DBM, DBM-D, DBM-I, or DBM-V Network Interface Module[1]			
Permissive (1 per 8 carrier slots) Programmable (1 per 8 carrier slots) – only for V.32 DBM and DBM-V	3000-F1-003 3000-F1-004	106303845 106303852	870-1581-8100 870-1582-8100
Carrier 4-Wire Switched 56 kbps DBM or DBM-S Network Interface Module (1 per 8 carrier slots)[1]	3000-F1-025	106758741	870-1673-5000
Carrier 24-port Network Interface Module			
NIM with the Make Busy and Service Line features (1 per 8 carrier slots)	3000-F1-027	107764490	—
NIM without the Make Busy and Service Line features (1 per 8 carrier slots)	3000-F1-028	107764508	—
Carrier DDD Network Interface Module			
NIM with the Make Busy feature:			
Permissive (1 per 8 carrier slots) Programmable (1 per 8 carrier slots)	3000-F1-010 3000-F1-011	106308489 106308505	870-1583-8100 870-1584-8100
NIM with the Make Busy and Service Line features:			
Permissive (1 per 8 carrier slots) Programmable (1 per 8 carrier slots)	3000-F1-018 3000-F1-019	106597875 106597883	870-1629-8000 870-1630-8000
NIM with the Service Line feature:			
Permissive (1 per 8 carrier slots) Programmable (1 per 8 carrier slots)	3000-F1-016 3000-F1-017	— —	870-1632-8000 870-1633-8000
DTE Interface Assembly 8-slot, 24-port	3821-F1-001	107764474	—
DTE Interface Assembly 2-slot, 6-port	3821-F1-002	107964482	—
DB25P to 8-pin Modular Adapter Cable	3821-F1-510	107764136	002-0050-0031
DB25S to 8-pin Modular Adapter Cable	3821-F1-511	107764144	002-0051-0031
Straight-In Plug-Socket Mass Termination (50-pin) Cable	10′ — 3000-F1-013 30′ — 3000-F1-014	107151797 107151813	035-0254-1031 035-0254-3031
Right-Angle Plug-Socket Mass Termination (50-pin) Cable	10′ — 4400-F1-501 30′ — 4400-F1-504	106472806 106472814	— —

[1] This NIM type does not provide the Make Busy or Service Line Feature.

Table D-2
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Equipment List

Equipment	Feature Number	Comcode	Part Number
Network Adapter Cables [2]			
50-pin to eight 6-pin Modular Network Interface Adapter, 1.5′, (Canada Only)	3000-F1-009	106459621	035-0258-0231
50-pin to eight 8-pin Modular Network Interface (DSU/JM8 Lease) Adapter for Digital or Lease Lines, 1.5′	3600-F2-503	106303837	035-0256-0231
50-pin to eight 8-pin Modular Network Interface (RJ45S/Programmable) Adapter, 1.5′	3600-F2-504	106459548	035-0257-0231
50-pin to eight 6-pin Modular Network Interface (RJ11C/Permissive) Adapter, 1.5′	3600-F2-505	106459928	035-0255-0231
50-pin to 24 6-pin Modular Network Interface (RJ11C/Permissive) Adapter, 1.5′	3821-F1-500	—	035-0312-0531
Multiport Cables			
TDM 60-pin Plug to five EIA-232 Socket Interface Connectors for multiplexing and digital sharing, 6′	3600-F2-500	106314651	035-0101-0631
Digital Bridge 60-pin Plug to five EIA-232 Plug Interface Connectors for multipoint dial backup, 6′	3600-F2-501	106315294	035-0102-0631
Telephone Cord 6-pin Modular RJ11C/Permissive DDD (PSTN) Plug	7′ — 4400-F1-531 25′ — 4400-F1-533	106472913 106472921	035-0274-0731 035-0274-2531
Telephone Cord 8-pin Modular RJ45S/Programmable DDD (PSTN) Plug	5′ — 4400-F1-541 14′ — 4400-F1-543 25′ — 4400-F1-544	— 106472962 106472970	035-0116-0231 035-0116-1431 035-0116-2531
NMS EIA-232 Interface Connector			
871A Adapter	4400-F1-590	106473119	002-0026-0031
Central-site 25-pin to 6-pin (873A) Adapter	4400-F1-594	106473150	002-0025-0031
Remote-site Adapter Cables (M6AY)	6821-F1-518	106261464	035-0185-5031
10-pin to 6-pin Cable (5′) (M6BK)	4400-F1-577	106473208	035-0106-0531
ANALYSIS Gender Adapter (1′)	4951-032F	105757496	835-4507-1011
NMS 6-pin Modular Cable	3′ — 4400-F1-510 10′ — 4400-F1-511 25′ — 4400-F1-512	106472830 106472848 106472855	034-0090-0631 035-0224-1011 035-0275-2531
Central Site: NMS Adapter feature 4400-F1-594 with Cable Feature 4400-F1-512	6821-F1-513	—	—
NMS Adapter Cable/Diagnostic Extension, 1.5′	3000-F2-510	106768690	035-0173-0031
3600 Hubbing Device	3600-F3-300	—	870-1669-5100
DATAPHONE II Device			
CC IN Connector Cable	4400-F1-576	—	035-0107-0531
CC OUT Connector 871B Adapter	4400-F1-591	—	002-0027-0031
DC IN Connector 870A Adapter	4400-F1-589	—	002-0030-0031
DC OUT Connector 872A Adapter	4400-F1-592	—	002-0022-0031

[2] These adapter cables are extended using a 4400-F1-501/504 or 3000-F1-013/014 cable.

Table D-2
(4 of 4)
Equipment List

Equipment	Feature Number	Comcode	Part Number
T1 Auxiliary Backplane	3100-F1-900	107170409	—
T1 Network Interface Multiport Adapter, 50-pin socket to eight 8-pin Modular Plugs (RJ48H-RJ48C), 30″	3100-F1-930	107200313	035-0264-0231
Diagnostic Channel Extension, 8-pin Modular Plug to 8-pin Modular Plug, 1′	3100-F1-910	107200339	036-0116-0131
T1 COM Port Adapter, DB25 Plug to 8-pin Modular Jack, 2″	3100-F1-920	107200321	002-0069-0031
T1 COM Port to Terminal Adapter Cable, DB25 Plug to 8-pin Modular Plug, 14′	3100-F1-540	406941534	—
T1 COM Port to PC Adapter Cable, DB9 Socket to 8-pin Modular Plug, 14′	3100-F1-550	406941542	—
T1 Front Panel Emulation (FPE) Diskette	3100-C1-010	406942110	—
T1 Harmonica Block	3100-F1-940	—	—
EIA-530-A-to-V.35 Adapter Cable	3100-F1-570	107116550	035-0244-0031
EIA-530-A-to-RS-449/422 Cable, 1′	3100-F1-580	107116543	—
SNMP LAN Adapters for 3100 T1 DSU/CSUs with Power Pack, COM Port 8-pin to 8-pin Cable, 14′, AUX Port 8-pin to 8-pin Cable, 14′, and Adapter 8-pin to 25-pin			
Ethernet LAN Adapter	21579	107554321	—
Token Ring LAN Adapter	21576	107554354	—

Glossary

ac	Alternating current.
ACCULINK	A product family and a registered trademark.
active core	The core that is transmitting data. For example, the DBM is the active core when the unit is in Backup mode. In the case of a DBM-D, DBM-I, DBM-S, or DBM-V, the primary core and the active core are the same.
ADp	Advanced Diagnostic protocol. An enhanced diagnostic communication protocol used with the 6700 and 6800 Series NMS and with certain front panel diagnostic functions.
aggregate	A single bit stream that combines two or more bit streams.
AIS	Alarm Indication Signal. A signal transmitted instead of the normal signal to continue transmission continuity and to indicate to the receiving terminal that a transmission fault exists at either the transmitting terminal or upstream of the transmitting signal. Sometimes referred to as Blue Alarm.
alarm	An abnormal condition affecting modems, multiplexers, and data services units, usually requiring attention. Major alarms indicate a service disruption; minor alarms are less severe, but are indications of a developing problem.
alternate port	The unused Port 1, either the V.35 or the EIA-232-D interface, provides an aggregate data path for an external dial backup unit.
analog signal	A type of signal composed of continuously variable values, used to transmit voice or data over telephone lines.
ASDS	ACCUNET Spectrum of Digital Services. An AT&T network service offering the alternatives of fractional T1, 9.6, 56 or 64 kbps (clear channel) digital, and analog access to a digital core network.
Async Terminal	This feature allows a device to be controlled from an async (asynchronous) terminal like an ASCII terminal. When enabled, the async terminal menus emulate the front panel without being limited by the 2-line, 16 character LCD, which can accommodate only three selections per screen.
AT command set	A group of commands, issued from an asynchronous DTE, that allow control of the modem while in Command mode. All commands must begin with the characters AT and end with a carriage return.

Auxiliary Backplane	An 8-slot backplane that fits over one half of the open section of the COMSPHERE 3000 Series Carrier. This is a passive assembly that provides interconnect capability between T1 CSUs and T1 DSU/CSUs and provides all interface connectors.
AWG	American Wire Gauge. An indication of wire size.
B-channel	Bearer Channel. ISDN 64 kbps bearer channel used for voice, circuit, or packet switched data.
backbone network	The main circuit that carries the data before it is split into extended circuits going to their final destination.
backplane	A common bus at the rear of the COMSPHERE 3000 Series Carrier connecting each circuit card slot to the SDCP and/or SDU. It also distributes low-voltage ac power to each slot.
bis	Latin for “twice.” Used to distinguish the second version of a standard from other versions; e.g., V.32bis.
BRI	Basic Rate Interface. ISDN interface consisting of B-channel for information transfer and D-channel for control and signaling.
bridge mode	All ports are assigned to one digital-sharing group.
cabinet	A structure that houses carriers (six maximum).
carrier	The rack mounting that contains 17 slots: 1 SDU control slot and 16 device slots.
carrier-mounted	A device that is designed for installation in a COMSPHERE 3000 Series Carrier and used at central-site operations. Up to 16 devices can be installed per carrier, with six carriers per cabinet.
CC	Control Channel. The diagnostic interface between an NMS and a network device.
CCITT	Consultative Committee on International Telegraphy and Telephony. An advisory committee established by the United Nations to recommend communications standards and policies. See ITU-TSS.
channel	A bidirectional DS0, voice, or data path, for electrical transmission between two or more points. Also called a circuit, line, link, path, or facility.
circuit	A logical connection between 2 devices, either point-to-point or multipoint.
circuit pack lock	A screw lock tab installed over a circuit card’s latch release tab to prevent the unit from being removed without a tool.
COM port	Communications port. A computer’s serial communications port used to transmit to and receive data from a modem. The modem connects directly to this port.
COMSPHERE	A proprietary product family and registered trademark.
connector	An outlet on equipment and cables that provides a connection.
connector module	An interface that is shipped with a modular DSU with TDM or MCMP and installed onto the rear of the COMSPHERE 3000 Series Carrier. The module contains six EIA-232 connectors, one for each port. The module also has a 26-pin high-density D-type connector located at the top of the module for V.35 operation on Port 1 or an aggregate data path.

connector plate	See rear connector plate.
control	A device that is, for diagnostic purposes, at the logical head of a hierarchical network. It is the unit from which tests and commands are issued to other units on the same circuit. There is only one control per link.
CSA	Canadian Standards Association.
CSU	Channel Service Unit. Protects the T1 line from damage and regenerates the T1 signal.
daisy chaining	Connecting the COM port of one device to the AUX port of another device to provide connectivity.
DATAPHONE II	The name of both a family of Paradyne NMS products (System Controller, Diagnostic Console, and Network Controller) and the network management protocol used by these products.
D-channel	The ISDN channel that carries signaling information to control call setup.
DB-25 connector	A 25-pin connector that is used to connect a cable which enables communication between two devices.
DBM	The optional Dial Backup Module for the 3600 Series DSU. This module provides an alternate data path in case of failure of the digital connection. DBMs available are: V.32 14.4 kbps analog DBM for backup through the PSTN, 2-wire Switched 56 DBM for digital backup service, 4-wire Switched 56 DBM for digital backup service, and ISDN DBM for digital backup service with one 64 kbps B-channel for data and voice and one D-channel for signaling information. The 4-wire Switched 56 DBM is only available for use in the U.S.
DBM-D	A carrier-mounted dial backup unit that provides automatic dial backup and service restoration of failed digital circuits using 2-wire access over 56 kbps switched digital services. The primary core is disabled and the unit functions as a DBM instead of a DSU.
DBM-I	A carrier-mounted dial backup unit that provides automatic dial backup and service restoration of failed digital circuits using an ISDN U-interface with two digital channels. The primary core is disabled and the unit functions as a DBM, not as a DSU.
DBM-S	A carrier-mounted dial backup unit that provides automatic dial backup and service restoration of failed digital circuits using 4-wire access over 56 kbps switched digital services. The primary core is disabled and the unit functions as a DBM, not as a DSU.
DBM-V	A carrier-mounted V.32 dial backup unit that provides automatic dial backup and service restoration of failed digital circuits over the PSTN. The primary core is disabled and the unit functions as a DBM, not as a DSU.
DBM-*X*	A carrier-mounted dial backup unit that provides automatic dial backup and service restoration of failed digital circuits. Can be DBM-D, DBM-I, DBM-S, or DBM-V. Primary core is disabled and does not include DSU functionality.
DC	Diagnostic Channel. The diagnostic interface between two network devices, used to extend the NMS diagnostics to downstream devices.
DCE	Data Communications Equipment. The equipment that provides the functions required to establish, maintain, and end a connection. It also provides the signal conversion required for communication between the DTE and the network.

DCP	Diagnostic Control Panel. The front panel of a device that continuously provides status information about the device's operation and allows an operator to manage its operation. This is a generic term used for both the standalone and carrier-mounted models.
DDD	Direct Distance Dialing. Telephone exchange service, the PSTN, that enables a telephone service user to access telephone lines without operator assistance.
DDS	Digital Data Service, such as DATAPHONE Digital Service or ACCUNET Spectrum of Digital Services, that provides digital communication circuits.
device	A standalone or carrier-installed circuit card.
Diagnostic Channel	A digital interface between a DSU and a modem used to extend diagnostics to the DSU via the modem.
Diagnostic Console	A DATAPHONE II NMS that uses the DATAPHONE II protocol.
Dial	A device operating on a PSTN line and requiring a dialing method and protocol to conduct data transmission.
dial network	See PSTN.
digital bridging	Provides the ability for dial backup of a multipoint configuration by bridging the signal on the digital side of the front end panel.
DIP switch	Dual In-line Package switch.
D-lead control	A control signal method which causes the associated modem to go off-hook in the Originate mode. With D-lead control signaling, a single signal lead is associated with each modem. Momentary connection of this lead to common ground activates the signal.
DOC	Canadian Department of Communication.
downstream	In extended networks, the direction in which diagnostic messages flow from the diagnostic control site to any intermediate links and then to the final tributary modem.
DPII	DATAPHONE II. The name of both a family of Paradyne DCE and NMS products (SC, DC, and NC), and the network management protocol used by these products.
DSA	Digital Switched Access (see IEC).
DSU	Data Service Unit. Data communications equipment that transmits digital data over a private line. Also used for limited distance communications over the PSTN when a high-speed modem is not needed.
DSX-1	Digital Signal Cross Connect level 1. An interconnection point for terminals, multiplexers and transmission facilities.
DS0	Digital signal level 0 (zero). A 64 kbps digital telecommunications signal or channel.
DTE	Data Terminal Equipment. The equipment, such as a computer or terminal, that provides data in the form of digital signals.
EIA	Electronic Industries Association. This organization provides standards for the data communications industry to ensure uniformity of interface between DTEs and DCEs.
EIA-232-D	An Electronic Industries Association's standard defining the 25-position interface between data terminal equipment and data communications equipment.

EIA-530-A	An EIA standard for a high-speed, 25-position, DCE/DTE interface.
extended network	The extension of a circuit where the tributary DCE is connected to a downstream (extended) control DCE.
FA	Facility Alarm. A failure condition reported to the NMS when there is a break in communication with one or more tributary.
FCC	Federal Communications Commission. Board of Commissioners that regulates all U.S. interstate, intrastate, and foreign electrical communication systems that originate from the United States.
FEP	Front-End Processor. A communications computer associated with a host computer that manages the lines and routing of data through the network.
FGRD	Frame ground.
ferrite choke	A ferrite choke is attached to a cable on the COMSPHERE 3000 Series Carrier to reduce electromagnetic interference and ensure compliance with FCC Part 15 Rules.
filler panel	Prevents accidental contact with the COMSPHERE 3000 Series Carrier backplane. Installed in all carrier slots that do not have a circuit card installed.
flex	The flex option is available for TDM or MCMP. When installed, each port can be set independently as either an EIA-232 or V.35 interface.
FPE	Front Panel Emulation. FPE diskette is used with an external PC connected to a T1 CSU or T1 DSU/CSU.
framing	A control procedure used with multiplexed digital channels where bits are inserted so the receiver can identify time slots allocated to each sub channel.
full-duplex	The capability to transmit in two directions simultaneously.
Hz	Hertz. A unit of frequency that equals one cycle per second.
IEC	InterExchange Carrier. A company that provides inter-LATA (local exchange carrier) telecommunications services, like AT&T, MCI, and US SPRINT. Access to these services can be provided through DDS dedicated channels, T1.5 dedicated access channels, or digital switched access (DSA) channels.
IOC	ISDN Ordering Code.
ISDN	Integrated Services Digital Network. Provides capability to carry voice and data while sending signaling on the D-channel.
ITU-TSS	International Telecommunications Union Telecommunications Standardization Sector. An advisory committee established by the United Nations to recommend communications standards and policies and allocate transmission frequencies. Before March, 1993, it was called CCITT.
JM8	A jack used for leased-line networks. Pins 1 and 2 are the transmit pair and Pins 7 and 8 are the receive pair.
kbps	Kilobits per second (thousand bits per second).
LADS	Local Area Data Set is used to provide a point-to-point link between two devices (also called LDM).

LAN	Local Area Network. A network that spans a small geographic area (e.g., a building).
LATA	Local Area Transport Area. A region served by a LEC that consists of one or more area codes.
LCD	Liquid Crystal Display. Thin glass plates containing liquid crystal material. When voltage is applied, the amount of light able to pass through the glass plates is altered so that messages can be displayed.
LDM	Limited-Distance Modem (also called a local area data set or LADS).
leased line	A private telephone line connection exclusively for the user. No dialing is necessary.
LEC	Local Exchange Carrier. A company that provides intra-LATA (local exchange carrier) telecommunications services, like NYNEX or Bell South.
LED	Light-Emitting Diode. A light or status indicator on the control panel that glows in response to the presence of a certain condition (e.g., an alarm).
Make Busy	An additional capability for DDD NIMs. This feature is useful when modems are used in a ‘‘hunt” or ‘‘rotary” group. The Make Busy feature ties the Tip and Ring signals together so that the modem appears busy.
MCMP	Multichannel Multipoint. A circuit card that enables the support of up to six independent applications over a single multipoint digital facility. The MCMP capability can support up to 40 tributary DSUs, each optioned with an MCMP card.
MI/MIC	Mode Indicate and Mode Indicate Common. A control signal method which causes the associated modem to go off-hook in the Originate mode. With MI/MIC signaling, two leads are provided, usually via Pins 3 and 6 of an 8-position modular VF connector: Mode Indicate and Mode Indicate Common. Actuation of the signal is by momentary connection of these two leads.
modem	MOdulator/DEModulator. A device used to convert data from a digital signal to an analog signal so that data can be transmitted over a telephone line. Once the data is received, the analog signal is converted back into a digital signal.
modular circuit card	A circuit card that contains gold finger contacts on the rear edge of the circuit card. A modular circuit card can be removed from the front of the carrier without disturbing DTE cables.
multiplex	To combine many low-speed data sources into a single, high speed serial data stream. The data is coded at transmission, and decoded at reception. Some multiplexing techniques include Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), and Statistical Multiplexing (Stat MUX).
multipoint circuit	A special type of circuit where one control device communicates in a broadcast mode with one or more tributary devices. Communication from a tributary device is always directly to the control device, and not to any of the other tributary devices.
multipoint line	A circuit connecting one control modem with one or more tributary modems.
MUX	Multiplexer. A device that enables the simultaneous transmission of multiple independent data streams into a single high-speed data stream.
network address	The user-assigned identification number for a particular device. The network address is used by a node to communicate with other nodes connected to it.

Network Controller	An NMS that uses the DATAPHONE II protocol.
Network Interface	The digital network vendor's termination device (modular jack, terminal block, etc).
NIM	Network Interface Module. The interface provided, up to two per carrier, for the PSTN.
NMS	Network Management System. A computer system used for monitoring and controlling network devices.
non-modular circuit card	A carrier-mounted circuit card with connectors mounted onto the card. This circuit card type requires that the DTE cables be disconnected before the circuit card is removed from the carrier.
permissive interface	A dial modem operating mode characterized by a fixed output power level of –9 dBm.
physical address	The diagnostic address of a control DSU or modem derived from its location in the carrier: its carrier and slot number.
point-to-point circuit	A data network circuit with one control and one tributary device.
power transformer unit	Provides low voltage ac power to the COMSPHERE 3000 Series Carrier; internal power distribution bus.
primary core	The circuit card that is normally running when power is supplied to the unit. In the case of a DBM-D, DBM-I, DBM-S, or DBM-V, the primary core and the active core are the same.
programmable interface	A dial modem operating mode characterized by an output power level (–12 to 0 dBm) set by a programming resistor in the datajack. It is one of two possible modes of operation for DSUs or modems connected to dial lines.
protocol	The rules for timing, format, error control, and flow control during data transmission.
PSTN	Public Switched Telephone Network. A network shared among many users who can use telephones to establish connections between two points.
punchdown block	Used for hardwiring cable circuits of a network interface.
rear connector plate	Used with modular devices, a connector plate is installed onto the rear of the COMSPHERE 3000 Series Carrier. It contains two DTE connectors and functions as an interface between the modular device and the DTE.
REN	Ringer Equivalence Number. Number of wires that can be connected to a telephone line.
RJ11C	A type of 6-position jack normally used with permissive dial networks and telephone sets.
RJ45	A type of 8-position jack normally used with programmable dial networks.
RMA	Return Material Authorization. Provided by customer assistance center for equipment return.
RS-232-D	An Electronic Industries Association's standard defining the 25-position interface between data terminal equipment and data communications equipment.
RS-449	An EIA standard for a general-purpose, 37-position, DCE/DTE interface.

SDCP	Shared Diagnostic Control Panel. A feature that allows carrier-mounted devices to share the same diagnostic control panel. Installed into one COMSPHERE 3000 Series Carrier, it controls and monitors the devices in all the carriers in the cabinet. A single SDCP can control up to 8 carriers, with a total of 128 devices.
SDU	Shared Diagnostic Unit. A circuit card installed in Slot 0 of the COMSPHERE 3000 Series Carrier that provides an interface between an optional SDCP and/or network management system and the devices in the carrier.
Service Line	An additional capability for DDD NIMs. This feature permits an extra dial line to be connected to a COMSPHERE 3000 Series Carrier. It can be used for NIMs or as a backup line when the primary line goes down.
SGRD signal ground	Signal ground. Pin 7 of an EIA RS-232 interface.
6-port connector module	See connector module.
slot	The carrier contains seventeen slots for circuit card installation.
speaker panel	An optional component that can be installed on the carrier to provide audio monitoring of any dial/lease modem.
switched 56 kbps digital service	A service provided by Local Exchange and InterExchange Carriers (LECs and IECs) that allow customers to use high-speed switched digital data capability without having to subscribe to private network services.
System Controller	A DATAPHONE II NMS that uses the DATAPHONE II protocol.
tail circuit	See extended network.
TDM	Time Division Multiplexer. A device that enables the simultaneous transmission of multiple independent data streams into a single high-speed data stream by simultaneously sampling the independent data streams and combining these samples to form the high-speed stream.
tributary	A device that receives commands from other devices in the network.
T1	A term for a digital carrier facility used to transmit a DS1 formatted digital signal at 1.544 Mbps.
U-Interface	Marks the demarcation line between the customer-provided equipment and the local telephone company. Interface provides basic rate access.
UL	Underwriters Laboratories, Inc. An organization which promotes product safety.
USOC	Universal Service Ordering Codes. Generic telephone company service ordering codes.
Vac	Volts alternating current.
VT-100	Terminal emulation mode used for asynchronous communications.
V.35	A CCITT standard for a high-speed, 34-position, DCE/DTE interface.

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